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The Oil Man's Calendar

MAR.	
8–10	**International Acetylene Association, Houston, Texas.**
16–17	**Southwestern District, American Petroleum Institute, Division of Production, San Antonio.**
20–22	**Western Petroleum Refiners Association, San Antonio, Texas.**
21–23	**Society of Exploration Geophysicists, Huckins Hotel, Oklahoma City.**
22–24	**American Association of Petroleum Geologists, Skirvin Hotel, Oklahoma City, Oklahoma.**
APR.	
3–7	**American Chemical Society, Baltimore, Maryland.**
11	**Pacific Coast District A. P. I. Division of Production, Los Angeles.**
13–14	**National Petroleum Association, Cleveland, Ohio.**
18–19	**Mid-Continent District, American Petroleum Institute Division of Production, Oklahoma City.**
18–20	**Southwest Gas Measuring Short Course, Norman, Oklahoma.**
24–29	**Oil-World Exposition, Houston, Texas.**
MAY	
3–5	**Petroleum Electric Supply Association, Houston, Texas.**
3–5	**Petroleum Industry Electrical Association, Houston, Texas.**
3–5	**Natural Gasoline Association of America, Tulsa, Oklahoma.**
15–18	**American Petroleum Institute, Mid-Year Meeting, New Orleans, Louisiana.**
18–20	**National Oil Scouts Association, Houston, Texas.**
JUNE	
3	**Illinois-Indiana Petroleum Association, Robinson, Illinois**
15–16	**Pennsylvania Grade Crude Oil Association, Hershey, Pa.**

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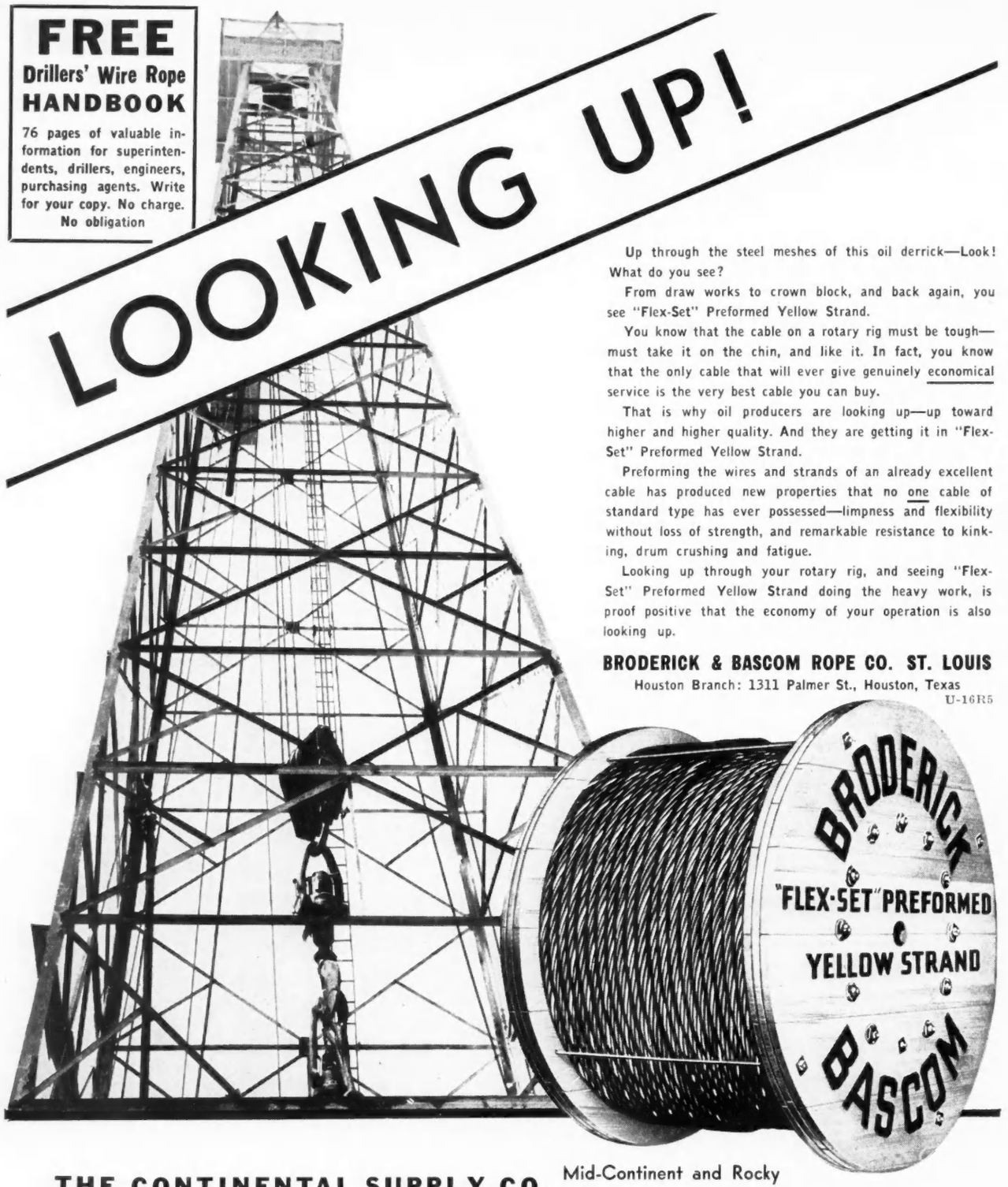

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This Week's Panorama

RECENT trends of operations in the oil industry, in the fields and at the refineries, have been unfavorable. Both production of crude oil and refinery runs have been excessive, and uneconomic additions to the stocks of crude oil and gasoline have resulted.

Crude Markets Under Pressure

It is true that crude stocks are comparatively small, being still near the 17-year low of 269,509,000 barrels that was reached in mid-December. But any additions to crude stocks must be recognized as undesirable, as various leading crude purchasing companies have more crude in storage than they need and would like to liquidate such excesses.

Obviously, in these circumstances, those purchasers currently are not actively bidding for supplies of new oil; and in various districts, demand languishes and the crude markets are weak.

In their efforts to find buyers nevertheless, some producers are accepting considerably less than the posted prices for their crude oil output, particularly in Michigan, Illinois, and some sections of the Mid-Continent. And the whole crude price structure consequently is weakened.

Crude Production Too High Lately

Much has been said in recent months about the sacrifices being made by producers in holding crude oil production down, and about the failure of refiners to exercise similarly strict control over their plant operations.

However, facts do not necessarily confirm the view that crude production has been adequately curtailed and that any difficulties now prevailing have been created by the refining division.

On the contrary, logical argument can be offered to show that crude production has not been adequately held down and that heavy crude production has been largely responsible for large refinery runs and unwarranted additions to gasoline storage.

Certainly, smaller crude production would have been conducive to stronger markets for crude oil and to smaller runs of crude to refinery stills.

Refiners Not Drawing from Storage

It is true that refiners may draw from crude storage as well as from the wells for their supplies of raw material, and that a reduction in current crude production might be nullified by heavy withdrawals of crude from the storage tanks. But such withdrawals have not been in progress in recent weeks. Crude stocks of the whole country were approximately the same on February 18 as three weeks previously; and since the beginning of this year, only about 1,500,000 barrels of crude oil have been taken out of storage. Consequently, the steady additions to gasoline storage in recent weeks have been made through the processing of only current crude production and not storage oil.

The producers have been feeding crude to the refiners faster than the refiners could dispose of the resultant finished products, and what the markets have not absorbed necessarily has gone into storage. In this way, heavy crude production has resulted in the production of surplus gasoline, which now is held in storage. Such surplus gasoline is conducive to continued weak prices for gasoline, and in turn, the unfavorable gasoline market naturally has a depressing effect on the market for crude, from which more low-priced gasoline would be made.

Crude Output Above Indicated Demand

That crude production has been larger than economically desirable has been evidenced by comparisons of actual output with the estimates of demand as made by the Bureau of Mines. In the week ended February 25, United States crude production averaged 3,328,850 barrels daily. That was 108,850 barrels of production daily in excess of the market demand for domestic crude, as estimated by the bureau. Furthermore, the actual output has been similarly above indicated market requirements since the end of January.

The increased production of February was the direct result of some liberalizing of allowables at the beginning of that month. Under the February allowables, most of the prominent producing states permitted production in excess of their respective market outlets, as estimated by the Bureau of Mines, Oklahoma having been the only major producing state that stayed within indicated economic limits.

Further High Production in Prospect

For March, moreover, the outlook for control of crude oil production is not favorable. Under the allowables prescribed for the month, continued production of crude in excess of market requirements is indicated.

Obviously, the problem of adequately controlling crude production has been complicated by the continued drilling of new wells, which must be allowed to share in the available market. As the new wells have come into the picture, per-well allowables have consistently come down; and opposition of producers to less favorable allowables has constituted pressure for the adoption of relatively liberal allocations.

Refinery Runs Continue Heavy

Refinery runs of crude oil have continued larger than economically desirable, and gasoline stocks

threaten to become seriously excessive by March 31, the beginning of the spring-summer consuming period. Details on the recent trends of refinery runs and gasoline stocks are given below.

Fuel Oil Taken from Storage

Although gasoline stocks have been steadily increasing, partially because of cold weather of February, the stocks of fuel oil have been diminishing, also because of the cold weather. The fuel oil inventories came down approximately 1,500,000 barrels, or to 133,671,000 barrels, in the week ended February 25. At that level, they were only 9.5 percent larger than one year previously. Such an increase in fuel oil supplies over a year ago is justified by the gain that has occurred meanwhile in the demand for those oils.

Gasoline Stocks Rise as Crude Runs Increase

THE latest weekly statistics of the oil industry furnished further strong evidence of the need for curtailing refinery runs and for reducing weekly additions of gasoline to storage.

As early as February 11, gasoline stocks had increased above the 80,000,000-barrel level regarded by petroleum economists as maximum requirements for the beginning of spring; and subsequently, the stocks have continued to increase steadily, having reached 84,597,000 barrels on February 25.

The gasoline inventory therefore is already more than 4,000,000 barrels larger than economically desirable, and it apparently is due to show a further substantial increase, possibly to around 90,000,000 barrels, between now and March 31, the beginning of the larger consuming season of spring.

In the past four weeks, gasoline has been going into storage at an average rate of 1,829,000 barrels weekly, despite the fact that crude runs to refinery stills were held between 3,140,000 and 3,125,000 barrels daily during three of the four weeks, after which they jumped to 3,185,000 barrels daily.

If additions to gasoline storage should be continued at the rate of the past four weeks during the coming five weeks, that is, until March 31, the stocks on hand on the latter date would be approximately 93,750,000 barrels. That would represent a new all-time peak for gasoline stocks, a little higher than the record level of 92,320,000 barrels reached on March 31 last year.

It is to be hoped, of course, that during March of this year, refinery runs will be controlled with particular strictness, and that weather conditions will prove conducive to good demand for gasoline. If these favorable conditions should prevail, it might be possible for the industry to enter the spring season with a gasoline inventory of 90,000,000 barrels or a little less.

However, it is definitely threatened that the gasoline stocks may be approximately the same on March 31, 1939, as on March 31, 1938. And this is not a pleasant prospect. For the substantial surplus included in the 92,320,000-barrel supply of gasoline on hand at the begining of last spring caused market difficulties that have never yet been surmounted. That surplus of last spring undoubtedly was materially responsible for the depressed prices of gasoline throughout 1938. And the current trends of refinery runs and additions to gasoline stocks threaten a repetition this year of last year's unfavorable markets.

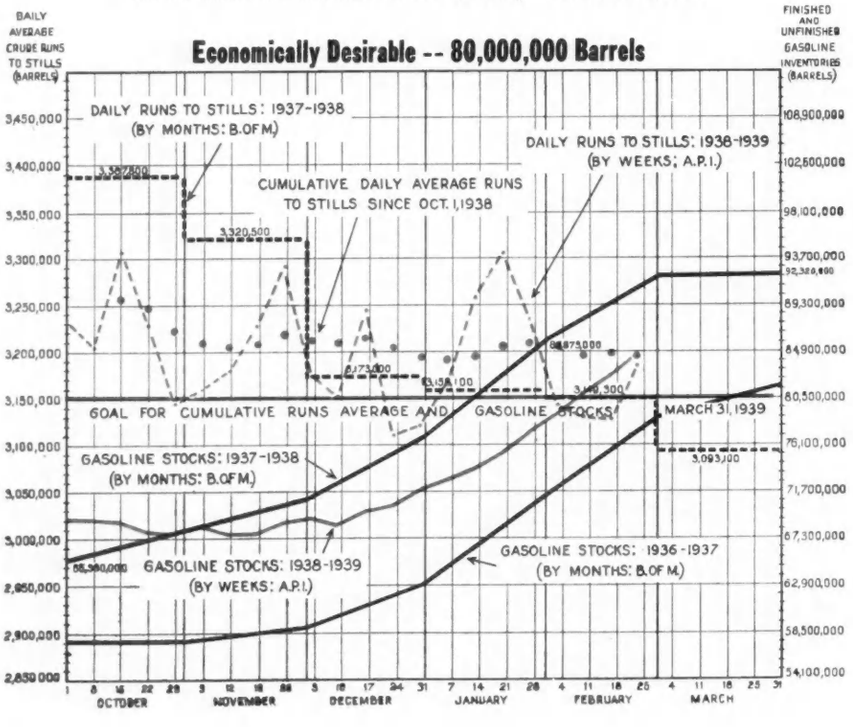
It is true that gasoline demand is a little better his year than it was last year. But the requirements are expected to be only about 4 percent greater for 1939 than for 1938, and this anticipated slight improvement of demand is taken into consideration by the petroleum economists in estimating that only about 80,000,000 barrels of gasoline in storage on March 31, 1939, would be sufficient.

The accompanying chart illustrates the trend of the gasoline situation since the beginning of the fall-winter season on October 1, 1938.

In the week ended February 25, latest week for which figures are available, crude runs to refinery stills averaged 3,185,000 barrels daily, having increased 60,000 barrels over the previous week's rate. And from October 1 to February 25, cumulative runs to stills had averaged 3,195,238 barrels daily, as indicated by the last red dot on the right, by reading the scale on the left.

A continuation of runs to stills at that same rate until March 31 would result in a gasoline inventory at that time of about 85,000,000 barrels, as indicated by reading the scale on the right side.

What Are Finished and Unfinished Gasoline Inventories Going to Be on March 31, 1939?



A. P. I. Puts U. S. Reserves At 17⅓ Billion-Barrel Peak

PROVED petroleum reserves of the United States have increased to a new record total estimated at 17,348,146,000 barrels as of January 1, 1939, it is indicated in the annual report of the American Petroleum Institute's Committee on Petroleum Reserves, made public February 26.

The new estimate, which refers only to reserves already proved by drilling and covers all grades of crude oil and distillate known to be recoverable under existing economic and operating conditions, reveals a net increase of 1,840,878,000 barrels over the 15,507,268,000-barrel estimate reported for January 1, 1938.

Additional information and further development during the past year necessitated an upward revision of the 1938 estimate by 2,243,571,000 barrels, the report explained. Discoveries of new pools and of new producing horizons in the old pools were reported to have added 810,493,000 barrels, making a total gain over 1938 of 3,054,064,000 barrels. The 1938 production of 1,213,186,000 barrels was deducted, making the net increase 1,840,878,000 barrels.

Texas was reported to have the largest reserves of any state, estimated at 9,447,764,000 barrels for January 1, 1939, as against 8,247,928,000 barrels a year ago. California's reserves were placed at 3,188,763,000 barrels in the new report as compared with 3,063,142,000 barrels in 1938. One of the largest gains due to new discoveries was reported for Illinois, developments in that newly-active producing area increasing to 242,847,000 barrels reserves estimated for January 1, 1938, as totaling only 40,884,000 barrels.

The committee stressed the fact that its estimates refer only to reserves already proved by drilling, and explained that pools tested only by one or two wells had been assigned relatively low reserves which considerably may be augmented by later development. Excluded were reserves which may be found in areas known to be favorable to oil-accumulation, but as yet untested. Every effort was made to obtain a fair, unprejudiced and representative opinion, the report added, with each member of the Committee on Petroleum Reserves appointing sub-committees in each district to compile and to study necessary data. All factors pertaining to the various pools were considered, examined, and adjusted in the light of new information, it was said, and the complete data compiled by more than 60 experienced geologists and petroleum engineers assisting in the work finally and carefully were checked by the committee itself.

Estimated Proved Petroleum Reserves in the United States

(Barrels of 42 gallons)

STATE	Proved Reserves as of January 1, 1938 (1)	Revisions in Proved Reserves (Including Extensions) in Fields Known on January 1, 1938 (2)	Estimated Proved Reserves in New Pools and New Producing Horizons Discovered in 1938 (3)	Total Columns 1, 2 and 3 (4)	*Production During 1938 (5)	Proved Reserves as of January 1, 1939 (6)
Eastern States:						
Illinois	40,884,000	17,828,000	208,064,000	266,776,000	23,929,000	242,847,000
Indiana	2,622,000	4,178,000	200,000	7,000,000	969,000	6,031,000
Kentucky	38,366,000	.....	5,000,000	43,366,000	5,821,000	37,545,000
Michigan	49,181,000	—3,451,000	16,230,000	61,960,000	19,211,000	42,749,000
New York	60,535,000	—15,000,000	.....	45,535,000	5,045,000	40,490,000
Ohio	28,456,000	1,200,000	.....	29,656,000	3,298,000	26,358,000
Pennsylvania	287,886,000	—70,000,000	.....	217,886,000	17,426,000	200,460,000
West Virginia	28,152,000	.....	.....	28,152,000	3,684,000	24,468,000
Total	536,082,000	—65,245,000	229,494,000	700,331,000	79,383,000	620,948,000
Central and Southern States:						
New Mexico (S. E.)	541,173,000	192,024,000	400,000	733,597,000	35,401,000	698,196,000
Texas	8,247,928,000	1,443,521,000	231,929,000	9,923,378,000	475,614,000	9,447,764,000
Oklahoma	1,212,252,000	98,400,000	26,600,000	1,337,252,000	174,882,000	1,162,370,000
Kansas	601,317,000	5,700,000	65,800,000	672,817,000	59,587,000	613,230,000
Arkansas	192,101,000	—20,978,000	35,200,000	206,323,000	18,077,000	188,246,000
Louisiana	713,434,000	335,764,000	85,870,000	1,135,068,000	94,812,000	1,040,256,000
Total	11,508,205,000	2,054,431,000	445,799,000	14,008,435,000	858,373,000	13,150,062,000
Rocky Mountain States:						
Wyoming	265,922,000	14,015,000	200,000	280,137,000	19,004,000	261,133,000
Montana	109,378,000	.....	.....	109,378,000	4,907,000	104,471,000
Colorado	19,125,000	.....	.....	19,125,000	1,412,000	17,713,000
New Mexico (N. W.)	5,414,000	.....	.....	5,414,000	358,000	5,056,000
Total	399,839,000	14,015,000	200,000	414,054,000	25,681,000	388,373,000
California	3,063,142,000	240,370,000	135,000,000	3,438,512,000	249,749,000	3,188,763,000
Total United States	15,507,268,000	2,243,571,000	810,493,000	18,561,332,000	1,213,186,000	17,348,146,000

* These are United States Bureau of Mines figures. No reserves were included for the states of Missouri, Tennessee and Utah for which the Bureau of Mines reports 68,000 barrels production in 1938.

Some Current Problems In Oil Conservation

Excessive drilling and resulting stocks tie up too much capital, creating instability and waste

By H. C. WIESS, President, Humble Oil & Refining Company

NOTWITHSTANDING the fact that great progress has been made in recent years in the study and application of principles and methods useful in efficiently managing the oil producing business, we are confronted today with some serious problems originating chiefly in that branch of the business but affecting every part of it. Oil is selling in some areas for as much as 40 cents per barrel below the prevailing price for established grades, quality and location considered. The price of refined products relative to the price of crude oil is too low. In many places wells go unconnected and can find no satisfactory market for their production. These conditions are of serious moment, and unless they are corrected will grow more acute and exert an adverse effect on stabilization and conservation.

The conditions described are in direct contrast to those existing two years ago. At that time the industry was enjoying a veritable boom. A comparison of the changes which have taken place and the reasons therefor should throw some light on our problems. An explanation or understanding of the occurrences which accounted for the prosperous conditions two years ago seems simpler than the second part of our task; that is, pointing the way out of existing difficulties. January 1, 1937, marked the culmination of three years of rapid growth in demand for petroleum products, following as a consequence of general improvement in business. This apparently was the principal factor in bringing about the buoyant situation. Partial solution of the deplorable conditions brought about by the discovery and intensive development of the East Texas field and the betterment of conditions in the marketing field, attributable in part to the operation of the Petroleum Code, both had a part in bringing about better feeling. All units in the industry had held down expenditures for maintenance and new development during the depression, especially in refining, with the result that refinery capacity was not available to flood the greatly expanded markets of these years with an excess of products. Great progress was made in conservation measures, production was held down, and stocks declined steadily over this three-year period. Under the influence of all of these favorable circumstances, crude and product prices advanced, and confidence in the stability of the price structure was developed to an unjustifiable and harmful degree. Optimistic forecasts were the order of the day. All of this induced the speeding up of well drilling and refinery construction. Products began to go into storage at a higher rate early in 1937. This continued throughout the year, the stocks reaching burdensome amounts by the close of the year. Under this pressure gasoline prices began to decline in July, 1937. Other products quickly joined the procession, and the decline continued for fourteen consecutive months with a single interruption of four weeks. By the late summer of 1938 crude prices began to decline, and that tendency has continued to this time.

Abstract of

Address before the Annual Dinner, Petroleum Section of the American Institute of Mining & Metallurgical Engineers, New York City, February 16, 1939

Toward the end of 1937 a lethargic industry began to feel the pinch of declining prices and recognized the impending harm which would inevitably follow if excessive drilling and the piling up of stocks of crude and products were not brought to an end. The rate of production was slowed down in 1938. Some reductions were made in drilling. The demand for crude and products in 1938, instead of showing a large increase as many had projected, was one percent less than the previous year. Facing the necessity of reducing excess stocks in a year of poor consumption, with a large increase in number of wells and expanded plants in all departments, valiant efforts on the part of a majority of the industry were not sufficient to reverse the downward tide. However, substantial correction has been made, and statistical conditions today involving the relation between supply and demand are better than they were either a year ago or two years ago, when prices for crude and products were stronger.

In pursuing our inquiry, let us consider in order the effect on our business of the rate at which drilling operations have been carried on, and the consequences of an overproduction of crude in certain areas, which has been accompanied by a disproportionate participation in the market for crude by such areas, and attempt to ascertain

what influence these factors have had in bringing about the current dual condition of instability and waste.

Time does not permit me to present as much of the available data pertaining to the rates of well drilling as this interesting and important subject deserves. Considering briefly the situation in Texas first, the figures show that 29,000 oil wells were drilled during the three years 1936, 1937 and 1938. Out of a daily average production for the state of 1,300,000 barrels, it is estimated that these wells are currently producing 600,000 barrels per day or 46 percent of the total. The rapidly increasing number of wells has made necessary continued reductions in the allowable per well in order to hold the state production within the limitations of demand. In 1934 the allowable production of proratable wells in Texas was 40.8 barrels per day. In 1938 it was 23.7 barrels per day, a cut of 42 percent. The decline in income per well thus brought about lengthens the time of pay-out, which often results in strong economic pressure to produce in excess of market requirements, and in closely drilled areas sometimes builds up field allowables to amounts which exceed efficient rates of production for the field as a whole, bringing about physical waste. Such practices also involve economic waste through tying up capital unnecessarily and bring instability to the industry.

The effect of excessive and unnecessary drilling is strikingly illustrated by the experiences in the East Texas field. The well drilling statistics for Texas are seriously affected by the 26,000 wells drilled in this field during the last seven years. In fact, the East Texas field has since its discovery exerted a dominating influence on almost all activities of our business. If we eliminate the East Texas wells from consideration, it appears that Texas had not suffered greatly from an excessive rate of drilling until about three years ago. The effect of excessive drilling in the state outside of East Texas prior to 1938 was concealed by a substantial increase annually in daily average production. When 1938 came along, with the decline in outlet for crude, the folly of our careless practices in the rate of drilling was felt with accelerated force. We awoke suddenly in Texas to find that only by shutting down all fields two days per week could a practicable means be found to hold the allowable production within the state's demand. It is considered by those who have given thorough and unbiased study to the question that 6000 wells in the East Texas field would have been adequate to provide efficient physical operation and effect the maximum oil recovery; yet, more than 26,000 wells have been drilled. The cost of the unnecessary wells drilled in this field alone is in excess of $200,000,000.

Similar conditions prevail in other states. A report for 1937 by a committee of the Independent Petroleum Association investigating unnecessary and unprofitable drilling, states that during the last few preceding years the amount spent throughout the United States for unnecessary drilling of wells totals annually between $85,000,000 and $100,000,000. For a number of years the soundness of the principle of wide well-spacing has been recognized by many operators, and

TABLE 2

Marginal and Proratable Production, Wells, and Production per Well in Texas
Showing Rapid and Important Decline in Proratable Well Production per Day Resulting from Greatly Increased Number of Wells

YEAR	1934	1935	1936	1937	1938
Average Daily Production					
Marginal:					
(a)	89,000	98,500	109,200	121,000	126,000
(b)	126,800	182,500	275,000	395,000	511,000
Proratable:					
(a)	956,000	976,500	1,059,800	1,278,000	1,176,000
(b)	918,200	882,500	894,000	1,004,000	791,000
Total	1,045,000	1,075,000	1,169,000	1,399,000	1,302,000
Average Number of Wells					
Marginal:					
(a)	26,750	29,200	30,100	31,000	31,800
(b)	28,150	34,150	40,250	46,500	52,700
Proratable:					
(a)	23,450	26,505	32,910	41,140	49,661
(b)	22,050	21,555	22,760	25,640	28,761
Total	50,200	55,705	63,010	72,140	81,461
Average Daily Production per Well					
Marginal:					
(a)	3.3	3.4	3.6	3.9	4.0
(b)	4.5	5.3	6.8	8.5	9.7
Proratable:					
(a)	40.8	36.8	32.2	31.1	23.7
(b)	41.6	41.0	39.3	39.2	27.5
All Wells	20.8	19.3	18.6	19.4	16.0

Source: Personal Analysis of Texas Railroad Commission Allowable Schedules.
Note: a. For the figures designated (a), the term "marginal wells" adheres to the definition given by statute.
b. For the figures designated (b), the term "marginal wells" includes also those wells which are prorated to or below the marginal allowable for wells of the depth as classified by statute.

TABLE 1

Number of Oil Wells Drilled in the United States, by States, 1929-1938, Inclusive

YEAR	Texas	New Mexico	Louisiana	Oklahoma	Kansas	Arkansas	Illinois	Michigan	Balance Eastern States	Balance Rocky Mountain	Total East of California	California	Total United States
1929	4,412	32	316	2,003	553	101	314	348	6,207	327	14,613	910	15,523
1930	3,424	162	373	2,056	446	46	117	151	3,886	187	10,848	755	11,603
1931	4,855	26	139	498	229	20	13	49	1,083	64	6,976	246	7,222
1932	7,340	44	210	643	364	4	12	113	1,568	66	10,364	168	10,532
1933	4,810	45	202	668	390	6	4	218	1,480	73	7,896	242	8,138
1934	7,109	107	389	1,161	591	35	10	274	2,457	178	12,311	452	12,763
1935	8,421	256	344	1,321	890	40	15	322	2,555	205	14,369	715	15,084
1936	9,120	551	663	1,790	1,214	24	42	338	3,788	203	17,733	790	18,523
1937	11,026	628	679	1,852	1,867	103	248	594	5,540	155	22,692	1,147	23,839
1938	9,013	494	690	986	1,108	204	1,806	566	3,211	171	18,249	993	19,242
Total 10 Years	69,530	2,345	4,005	12,978	7,652	583	2,581	2,973	31,775	1,629	136,051	6,418	142,469

Source: Trade Journal.

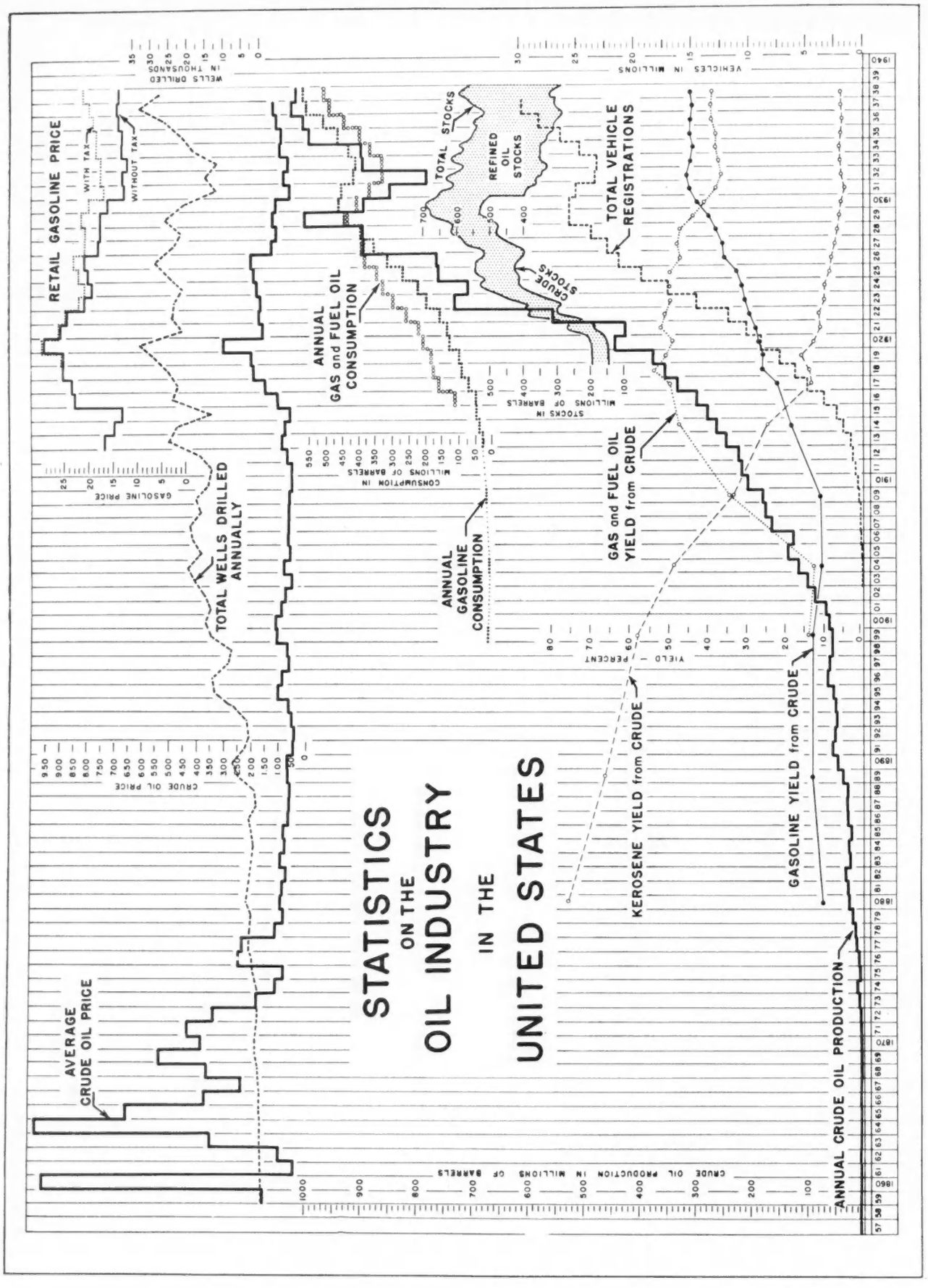

STATISTICS
ON THE
OIL INDUSTRY
IN THE
UNITED STATES
RETAIL GASOLINE PRICE
WITH TAX
WITHOUT TAX
GASOLINE PRICE
TOTAL WELLS DRILLED ANNUALLY
WELLS DRILLED IN THOUSANDS
AVERAGE CRUDE OIL PRICE
CRUDE OIL PRICE
ANNUAL GAS and FUEL OIL CONSUMPTION
CONSUMPTION IN MILLIONS OF BARRELS
ANNUAL GASOLINE CONSUMPTION
TOTAL STOCKS
REFINED OIL STOCKS
CRUDE STOCKS
STOCKS IN MILLIONS OF BARRELS
TOTAL VEHICLE REGISTRATIONS
VEHICLES IN MILLIONS
GAS and FUEL OIL YIELD from CRUDE
KEROSENE YIELD from CRUDE
GASOLINE YIELD from CRUDE
YIELD — PERCENT
ANNUAL CRUDE OIL PRODUCTION
CRUDE OIL PRODUCTION IN MILLIONS OF BARRELS

TABLE 3

Trend of Well Spacing in Texas

Showing Predominance of Close Well Spacing Prior to 1929 and Trend Toward Much Wider Spacing During Recent Years

Year of Discovery	ACRES PER WELL							
	Less than 5	5–10	10–15	15–20	20–30	30–40	40 and Above	Total
	NUMBER OF FIELDS							
Prior to 1929	63	45	35	18	13	1	6	181
1929	3	12	4	3	1	..	3	26
1930	1	6	3	3	5	..	5	23
1931	1	2	1	3	3	..	1	11
1932	1	3	2	3	..	4	2	15
1933	2	3	2	4	5	..	3	19
1934	1	5	7	8	9	3	5	38
1935	3	6	10	3	17	3	3	45
1936	2	6	16	3	11	2	7	47
1937	1	11	12	5	16	4	9	58
1938	..	1	11	7	17	4	9	49
Total	78	100	103	60	97	21	53	512
Comparison Between Spacings of Last Ten Years with Those of Previous Years								
Prior to 1929:								
Number of Fields	63	45	35	18	13	1	6	181
Percent of Total.	34.81	24.86	19.34	9.94	7.18	.55	3.32	100
Last 10 Years:								
Number of Fields	15	55	68	42	84	20	47	331
Percent of Total.	4.53	16.62	20.54	12.69	25.38	6.04	14.20	100
Total:								
Number of Fields	78	100	103	60	97	21	53	512
Percent of Total.	15.24	19.53	20.12	11.71	18.95	4.10	10.35	100

notwithstanding the great number of wells drilled, there has been a tendency toward wider spacing. Figures show that whereas prior to 1929 only 7 percent of the Texas fields were drilled on 20 to 30 acre spacing, during the last ten years more than 25 percent of the fields have been drilled on this basis. Likewise, whereas prior to 1929 only 3-1/3 percent were drilled to a spacing of 40 acres and above, during the last ten years more than 14 percent have been drilled on this spacing. Despite this tendency, however, drilling of unnecessary wells has continued in many important areas with the results set forth above.

One naturally asks the question why unnecessary drilling continues in the face of decreasing well allowables and constant lengthening of pay-outs. We think the answer lies primarily in the fact that in nearly all the states, in the allocation of allowables between properties, too great emphasis is given to wells as such, or to the potential production from wells, and too little emphasis to the quantity of recoverable oil underlying the properties being drilled. So long as a well secures its allowable on this basis, and its drilling is profitable, the tendency is to multiply the number of wells. If an operator knew that when he drilled an unnecessary well he would not increase his production, unnecessary drilling would stop. The advantage gained by any operator who drills an unnecessary well tends to cause the adjoining operator to drill unnecessary wells on his property in an attempt to protect himself. In this way there is a tendency, in the absence of a spacing rule enforced without exceptions, for greatly excessive numbers of wells to be drilled in many fields. This was the occasion for the close drilling of the East Texas field and numerous other fields in Texas and elsewhere. The industry and the conservation bodies can contribute to the solution of this problem by basing the allocation of production or allowables between properties in some fair and substantial relation to their respective recoverable oil reserves. When this is done the operators will drill only such number of wells as are necessary to produce their own oil in an efficient manner. The problem of unnecessary drilling is an acute one, and must be dealt with seriously and promptly. It behooves the entire industry, the banking interests, and the regulatory authorities of the various states to take stock of the situation and to work out an effective solution. I submit that as a practical matter, a satisfactory solution would be effected by a consistent program of fair allocation of allowables between properties and of providing and enforcing regulations for uniform and wide spacing of wells.

The practical defense the individual producer has is to drill fewer wells in order to recover his reserve; to get more barrels of oil from the ground for each well drilled. Why pile up investments in wells in the face of steadily declining well allowables? Why drill two wells when one will get the oil? Is not the surest answer to heavy expenditures and decreasing allowables, to space wells wider, to drill one well to twenty acres where before we drilled a well to ten acres, and even to increase the spacing to forty and eighty acres per well? This is an individual problem as well as an industry problem, and one in conservation administration. Each operator has a part to play by adopting a policy of wide spacing and by assisting in bringing about the adoption and application of rules that will withdraw the incentive for excessive drilling.

These conditions growing out of unnecessary drilling are seriously in need of immediate correction. However, they do not account entirely for the trouble confronting the industry at present. With the proration system today, under which effort is being made to limit the storage of crude and products to that amount required as working stocks, and to hold unneeded oil in natural reservoirs, and under which the industry and the conservation agencies are keenly observant of changes in stocks of oil, any sudden supply of oil from new sources injected into the stream going to market displaces production from sources already held under substantial restraint. The industry was able to absorb in its stride flush production in quantity from such fields as Rodessa during the period of phenomenal demand from 1935 to 1937. However, it cannot stand such shocks today. The forcing into the market of production from new areas of importance at this time causes serious disturbances. One result is to decrease purchases by established buyers in existing fields, sometimes at great distance from the new area. This transmits immediately the difficulties in new areas to distant established fields previously enjoying stable conditions.

During the year 1938 the industry in established producing areas was forced to bear the burden of increased production from important areas at the same time that total national demand for crude diminished. The average daily production for the United States in December, 1938, was 230,000 barrels per day less than the average for the year 1937. The daily average production for the states of

Louisiana, Illinois and Arkansas for the same month in 1938 was 123,000 barrels per day greater than the daily average production of these three states during the banner year of 1937. In other words, it was necessary for other oil producing states to reduce production by 353,000 barrels per day to take care of the decline in national production and compensate for the substantial increase in participation by the three states mentioned. Having in mind the problems of control brought on by the drilling of excessive wells, the magnitude of the additional difficulties presented by forcing into the market production from these new areas is apparent. A substantial part of the increased production referred to is going to market at a discount. Furthermore, competent engineers estimate that many of the fields in these states are being produced at excessive rates, resulting in waste and lower ultimate recovery. Thus advantage is not being taken of the progress and experience of the past fifteen years. Given time, economic forces would correct the situation from a stabilization standpoint, but at great cost. The physical waste occurring in the meantime could never be remedied. It seems that a logical solution would be found by the acceptance in practice of established principles of efficient operation such as I have described, by taking hold of the situation promptly, it can be corrected. The opportunity is open to profit by the earlier painful experiences of others and to avoid sacrifices not only by the particular areas involved, but by the industry in general.

During the last ten years, the discovery of new fields and the proving up of larger deposits than previous estimates had indicated for older fields augmented our proved reserves in the United States approximately 15,000,000,000 barrels. During the same period production amounted to approximately 10,000,000,000 barrels, resulting in net additions to reserves of approximately 5,000,000,000 barrels. Of this amount, approximately 4,000,000,000 barrels are accounted for by the East Texas field. The production for the five-year period beginning with 1929 averaged 900,000,000 barrels per year. We estimate the average annual production over the next five years at approximately 1,350,000,000 barrels. This is an increase of approximately 50 percent. It all indicates that, unless the rate of discovery is accelerated, we may expect slight, if any, additions to reserves during the next five-year period, and a likelihood of a decrease in reserves expressed in terms of years' supply. It would appear, therefore, that the difficulty lies not in the presence of proved reserves, but in the undue rate at which some of the existing reserves are being depleted. While in some states reserves are being depleted at a rate indicating 18 to 20 years' supply, some other states are producing at rates allowing for only about six years' supply. It is this rapid rate of depletion in some areas of the country that gives rise to the immediate problem of overproduction and consequent waste.

In certain respects the problem of potential overproduction which we face today is different from the overproduction of the past. Heretofore the problem has been confined either to specific fields or limited areas, and was not general or distributed over several states as it is today. We have not had a great deal of experience in working out or applying sound principles for distribution of the total market outlet between the states, although considerable groundwork has been laid during the last three years by the Inter-State Compact Commission. In this problem, as in that of allocating the total production of any state between fields, the principle of waste prevention should play a large part and the distribution should not depend entirely on localized market demand.

Large allowables should not be assigned under the guise of localized market demand when, as a matter of fact, the market is obtained only at a serious sacrifice of price or by loss of markets elsewhere. When new production forces its way into the markets by such means it actually indicates the absence of real market demand.

Times does not permit me to prolong this discussion. I attach several tables of statistical data and a graph supporting factual statements which I have made and giving material information for aid in understanding the problems discussed. In the light of the principles which I have outlined and the analysis of present-day conditions, and out of my observation, study and experience, I would like to submit for consideration, analysis and application the following broad policies:

1. Our oil reserves should be developed and produced with maximum practical efficiency both from physical and economic viewpoints.

2. To attain such maximum efficiency it is essential that the total production of the United States be restricted to market demand requirements.

3. To attain such maximum of

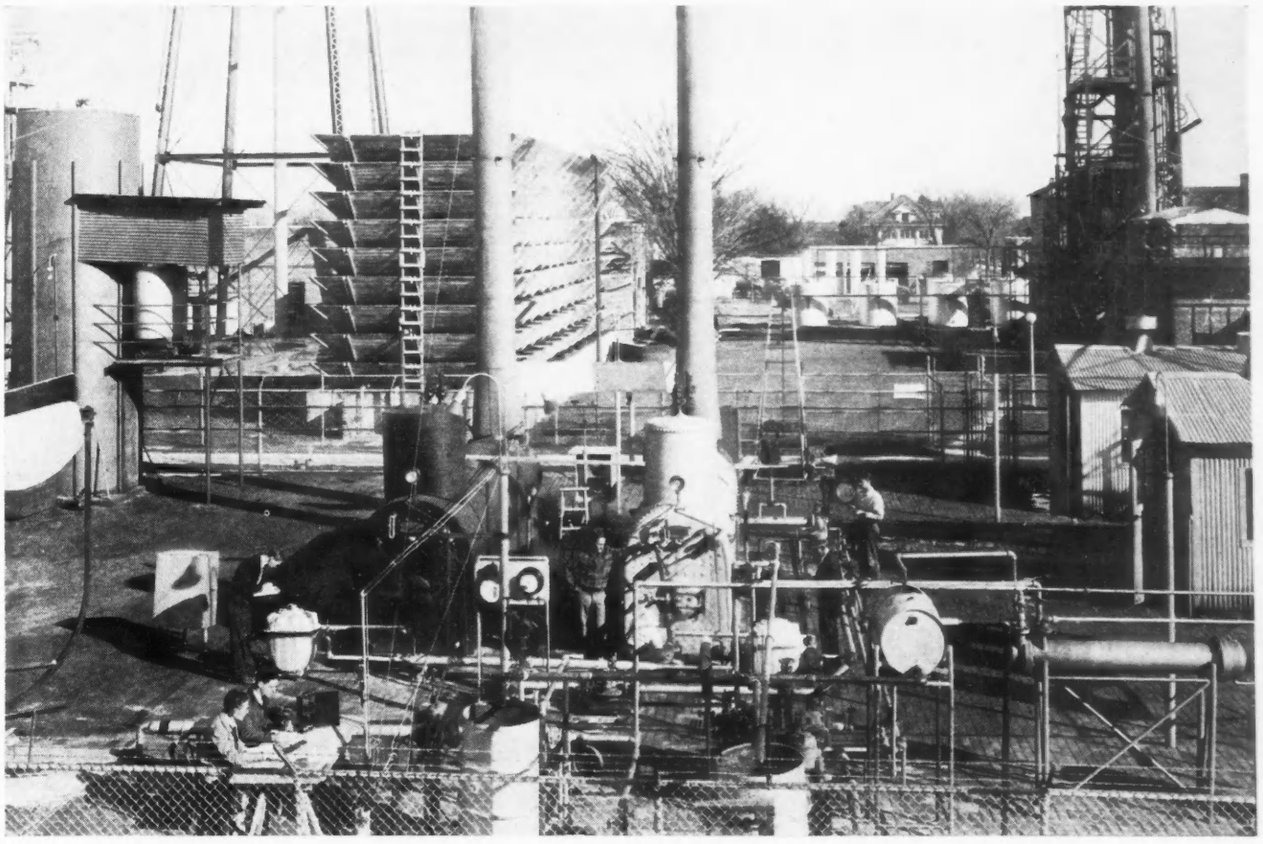
[*Continued on page 52*]

TABLE 4

Average Daily Production of Crude Oil in the United States, by States, 1929-1938, Inclusive

YEAR	Texas	New Mexico	Louisiana	Oklahoma	Kansas	Arkansas	Illinois	Michigan	Balance Eastern States	Balance Rocky Mountain	Total East of California	California	Total United States
1929	814,000	5,000	56,000	700,000	117,000	68,000	17,000	12,000	100,000	70,000	1,959,000	801,000	2,760,000
1930	795,000	28,000	64,000	593,000	114,000	54,000	16,000	11,000	99,000	63,000	1,837,000	623,000	2,460,000
1931	910,000	42,000	60,000	495,000	101,000	41,000	14,000	10,000	89,000	53,000	1,815,000	517,000	2,332,000
1932	853,000	34,000	60,000	418,000	95,000	33,000	13,000	19,000	86,000	47,000	1,658,000	487,000	2,145,000
1933	1,103,000	39,000	69,000	499,000	115,000	32,000	12,000	22,000	79,000	40,000	2,010,000	471,000	2,481,000
1934	1,045,000	46,000	90,000	493,000	127,000	31,000	12,000	29,000	89,000	48,000	2,010,000	478,000	2,488,000
1935	1,075,000	56,000	138,000	508,000	150,000	30,000	12,000	43,000	94,000	55,000	2,161,000	569,000	2,730,000
1936	1,169,000	74,000	220,000	564,000	159,000	29,000	12,000	33,000	98,000	60,000	2,418,000	587,000	3,005,000
1937	1,399,000	106,000	249,000	627,000	194,000	32,000	21,000	46,000	105,000	73,000	2,852,000	653,000	3,505,000
1938 (Est.)	1,302,000	98,000	262,000	476,000	162,000	50,000	64,000	52,000	99,000	70,000	2,635,000	685,000	3,320,000
Bureau of Mines Estimates of Demand for Crude Oil, by States, Barrels Per Day, 1934-1938, Inclusive													
1934	967,700	45,500	81,500	469,400	122,800	31,500	12,900	30,400	86,100	43,600	1,891,400	466,000	2,357,400
1935	1,034,800	51,900	120,300	499,200	145,800	30,300	11,000	35,800	90,800	49,900	2,069,800	499,700	2,569,500
1936	1,113,100	68,450	173,900	540,000	151,600	30,100	11,800	36,100	93,700	54,300	2,273,050	541,060	2,814,100
1937	1,338,000	96,800	243,900	609,700	187,250	29,900	15,000	38,000	104,900	70,600	2,734,100	610,300	3,344,400
1938	1,354,500	107,400	247,900	528,700	170,200	46,600	44,400	53,800	99,900	76,200	2,729,600	653,200	3,382,800

Source: United States Bureau of Mines.



Boilers and refinery equipment used by students of University of Oklahoma at Norman

Petroleum Engineering Schools Have Over 4,000 Enrolled

FULL courses in petroleum engineering have been established in 18 American universities, and several additional schools offer limited courses along petroleum lines. The increase in the number of students enrolled in petroleum engineering courses has been rapid during the past few years, since the application of practical engineering to the production of oil has opened a promising field for the trained man.

An analysis of the present enrollment of students in petroleum engineering courses in the various schools of the country reflects the growth in interest from year to year. Graduates in the 1938 class numbered only 281, while the prospective graduates in the 1939 class total 410. Almost every school shows a larger number in line for graduation in 1939 than in 1938, the increase being 100 percent in several instances.

The total enrollment in petroleum engineering in all schools is 3,484, but several universities do not require a declaration or choice of course until the third or fourth year. An allowance for students of this type brings the enrollment to 3,539 in 20 schools in the United States.

The freshman enrollment in the 20 schools is 1,293, or more than twice the number of freshmen of a few years ago. When an allowance is made for freshmen who have not declared their option but who will take petroleum engineering courses in their junior and

The Mining Building, University of California, Berkeley, houses the Petroleum Engineering Department.

senior years, the freshman total is increased to 1,373. At least six universities do not require a choice in the field of specialization until the junior year, the first two years being devoted to the fundamentals of engineering.

One university does not require undergraduates to register in any department, and petroleum engineering is a graduate course. The degree is granted after two years of graduate work in the "Petroleum Division."

One of the largest petroleum engineering schools in the country has observed that students who eventually graduate from the university first enrool for a year or more in the various junior colleges of the state. This school reports the freshman class as the smallest of the four.

In several schools the petroleum engineering courses are attached to mining or general engineering departments, and it is difficult to determine the number of prospective students for the junior and senior petroleum engineering classes. The predominance toward other engineering courses in these schools should be attributed to tradition and the desire to further older established courses. Many of the newer engineering schools offer petroleum engineering courses as featured options. These schools are largely located in the petroleum-production districts.

Contribute to Petroleum Engineering Research

Universities have contributed heavily to petroleum engineering research. Field problems of every type are studied, and college laboratories are recognized by oil companies and equipment manufacturers as the logical clearing house for the mass of data that must be considered. The scientific study of drilling muds; function of various mechanical arrangements; testing porosity, permeability, and screen analysis of oil sands; chemistry; pipe line operation and maintenance; natural gas; reservoir pressure; power transmission; oil field management; property management; engineering geology; and reservoir engineering, and economics bring to the student a broader scope than can be furnished by practical study in the field alone.

The application of engineering to petroleum development has done much to eliminate the rule-of-thumb methods that were used during the early and intermediate periods. Universities were slow to offer petroleum engineering courses, but the industry itself was largely at fault for the lack of recognition.

Deep drilling has brought about numerous problems that can be solved only by exact methods. Petroleum engineering courses are designed to meet conditions encountered in the difficult development of today.

Pumping operations are fully considered in petroleum engineering courses. Deep producing wells often can be pumped at a profit only under certain conditions. Successful operation of such producers involves the application of sound engineering principles. Field dynamometer test of pumping wells is a part of the work offered by many schools.

All schools offering full engineering courses attempt to give the student a basic engineering background that may be applied to oil field operations.

On the following pages are given details of the several schools offering petroleum engineering courses, together with brief data on their faculties

and building and laboratory equipment for this course.

UNIVERSITY OF CALIFORNIA
Berkeley, California

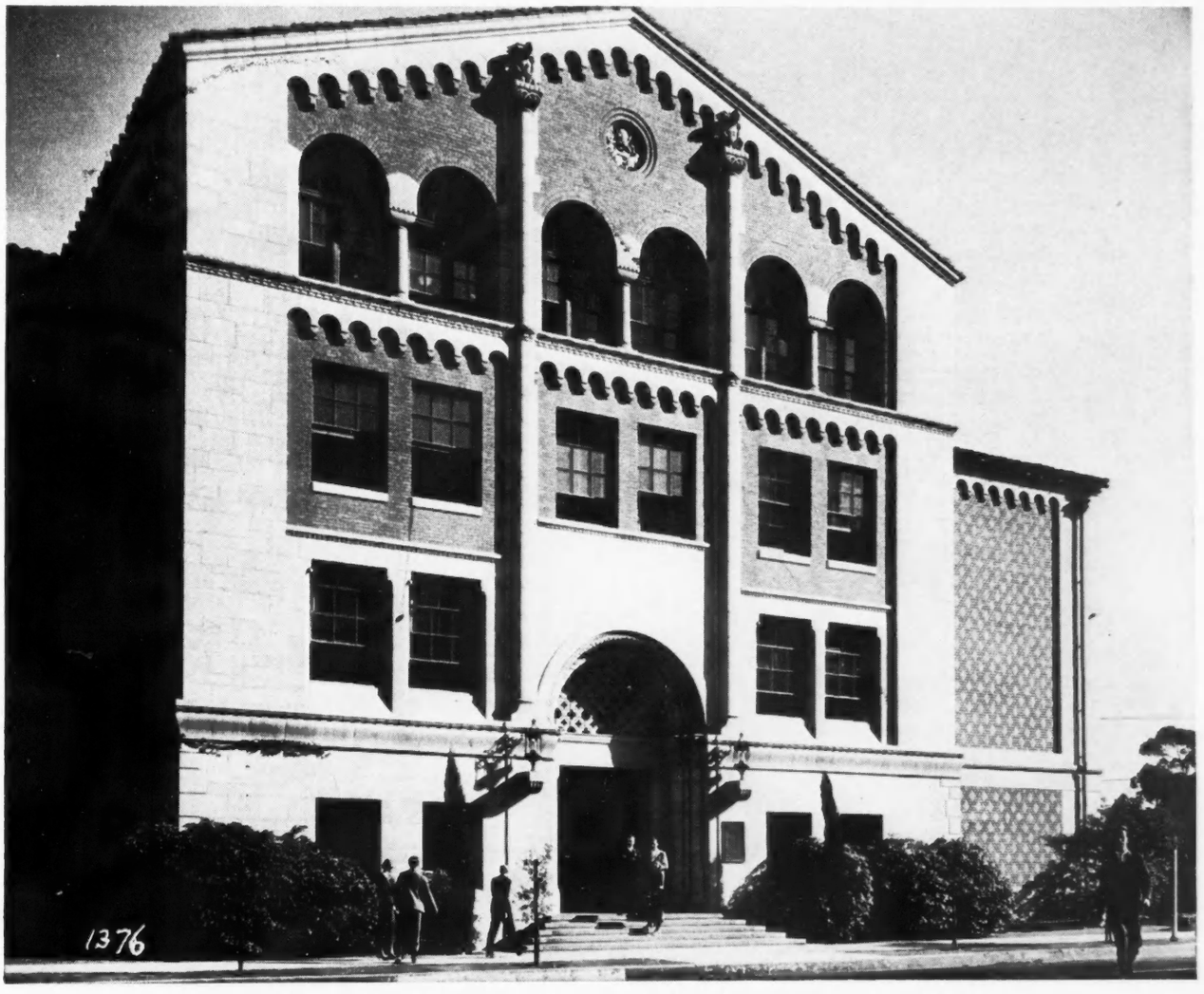
Department Head: Lester C. Uren.*
Petroleum Engineering Department Established: 1915.
Faculty: Lester C. Uren, B.S. University of California; A. J. Carlson, B.S. Minnesota School of Mines, M.S. and Ph.D. University of California.
Number of Graduates in 1938 Class: 20.
Number Graduates in 1939 Class: 30.
Number Enrolled in Department: 150.
Number in Freshman Class: 40.†
Remarks: This school offers a four-year curriculum in "Petroleum Engineering" designed to meet the needs of engineering students who plan to seek technical or administrative positions in the petroleum industry. This curriculum includes a complete sequence of courses in mathematics, physics, chemistry, geology, civil, mechanical and electrical engineering. The faculty is one of the best known in the country. All engineering curricula of the university have been approved by the Committee for Professional Development, which recently made a survey in the United States under the auspices of the "Engineering Foundation" (A.I.M.E., A.S.C.E., A.I.E.E., A.S.M.E.).

*The University of California does not have "heads" of departments in the ordinary sense of the word. L. C. Uren is senior professor. Petroleum engineering is a phase of the work of the Department of Mining and Metallurgy, of which Dean F. H. Probert is chairman.
†Many students who eventually will graduate from the university, first enroll for a year or more in various California junior colleges. The freshman class is the smallest of the four.

The university offers a complete program of courses dealing with all phases of petroleum technology. Unusual facilities are provided for laboratory research, especially on topics of interest in the production branch of the industry. The graduate school is well developed.

UNIVERSITY OF SOUTHERN CALIFORNIA
Los Angeles, California

Department Head: John Franklin Dodge.
Petroleum Engineering Department Established: 1927.
Faculty: John Franklin Dodge, B.S. and M.S. University of California, M.S. University of Southern California; Robert Vivian, A.M. and Ph.D. Columbia University; Thomas Clements, E.M., M.S. and Ph.D. California Institute of Technology.
Number Graduates in 1938 Class: 6.
Number Graduates in 1939 Class: 14.
Number Enrolled in Department: 75.
Number in Freshman Class: 22.
Remarks: The upper division courses chiefly include the following:
The Petroleum Production Industry: Geological and geographical occurrence of petroleum. Acquisition of oil lands, legislation affecting oil field development. Location of wells, methods of drilling oil and gas wells. Completion methods to avoid waste of oil and gas. Methods of producing oil, pumping, gas lift, repressuring. Gauging methods, dehydration, storage, and transportation of oil. Methods used to prevent evaporation and fire losses.
Petroleum Production Practice: Field trips to oil-pro-



Bridge Hall on the University of Southern California campus houses, with other departments, the Division of Petroleum Engineering.

Administration Building, Colorado School of Mines.

ducing properties. Class discussion and written reports on drilling and producing equipment and operations.

Refining, Distribution, and Utilization of Products: Refined products and their use for fuels, generation of light and power, and lubrication. Designing, estimating, and operating skimming plants, topping plants, and complete refineries; cracking plant design and operation; costs of refining under different systems. Distribution and selling of refined products; rules and regulations for distribution.

Oil Land Leasing and Valuation: Appraisal of oil lands, estimation of future production and operating costs, depreciation of material, salvage, value of future profits. Federal and state tax reports.

The Petroleum Industry: A general introductory survey of the technology and economics of the several divisions of the petroleum industry. Geological and geographical occurrence of petroleum. The production of oil, its transportation, refining, marketing, and utilization. The economic status of the oil industry.

Mathematical Analysis in Petroleum Problems: The application of specific methods in algebra, trigonometry, analytical geometry, and calculus to problems in reservoir and well performance.

Design and Operation of Natural Gasoline Plants: Design of oil and gas lines; metering of gas; theory of absorption and methods of computation; theory and design of gasoline plant equipment; testing and sampling. Place of steam in plant production; uses of evaporators and water softeners in the manufacture of bottle gas; butane gas plant design and operation; and safety features in gasoline plants. A general survey course for workers in natural gasoline plants.

The graduate courses include courses in the exhaustive study of petroleum development practice, seminar in problems of petroleum production management, thesis work, and research along various lines.

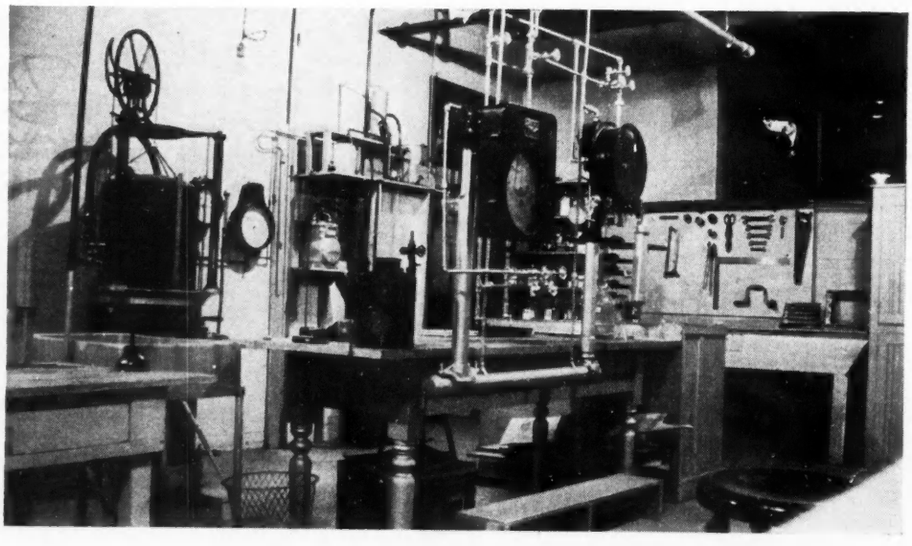
COLORADO SCHOOL OF MINES
Golden, Colorado

Department Head: Clark F. Barb.
Petroleum Engineering Department Established: 1921.
Faculty: Clark F. Barb, P.E. and M.S. Colorado School of Mines; James O. Ball, C.E. University of Colorado.
Number Graduates in 1938 Class: 19.
Number Graduates in 1939 Class: 19.
Number Enrolled in Department: 176.
Number in Freshman Class: 62.
Remarks: Laboratories are equipped for testing work and analysis in both refining and production. A complete course is given in core testing.

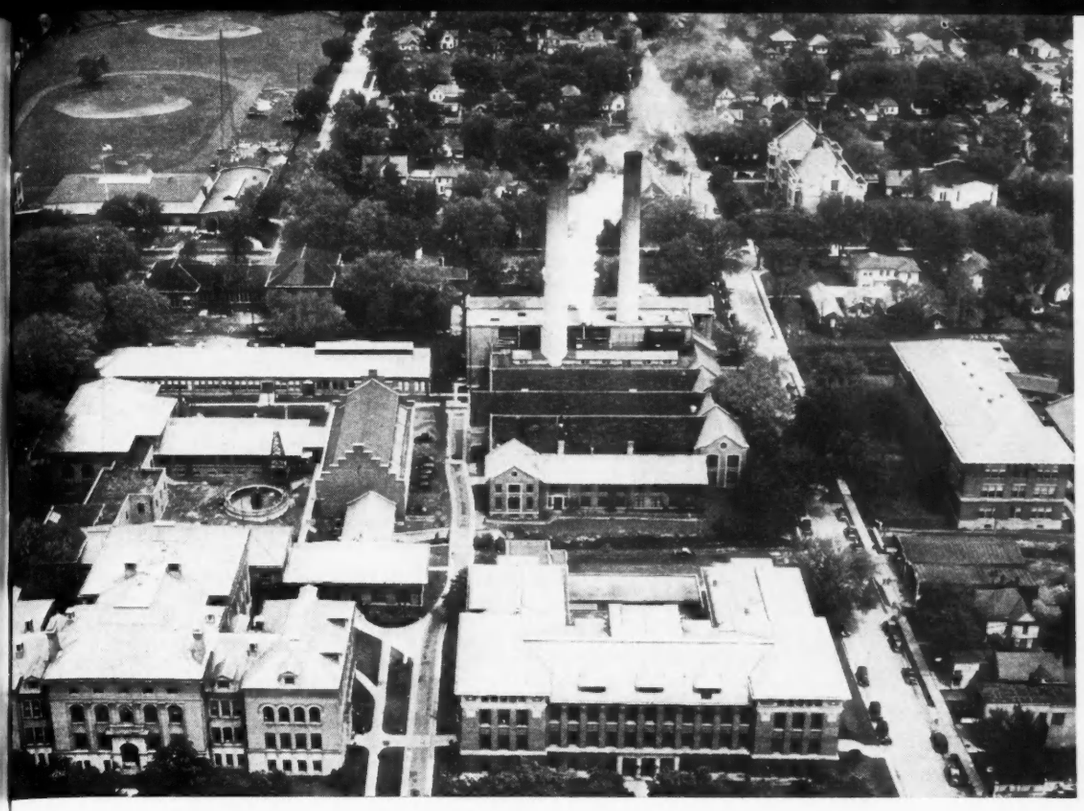
Seniors make a two-weeks inspection trip in the spring before graduation. Inspection trips to fields and refineries are a regular part of the junior and senior work.

Special attention is given to the economics of both production and refining and all seniors have a problem in which final costs of producing or refining a barrel of oil must be calculated.

Another feature of this school which aroused considerable newspaper interest is that it was the first to give its



Part of the Motor-Testing Laboratory, Colorado School of Mines.



The Engineering Group, University of Illinois.

graduates a solid silver diploma at commencement. This is now the regular practice here.

The general trend in this school, after about 17 years of experience in training petroleum men, has been to reduce the number of purely petroleum courses to those of a fundamental nature to give the extra time to the more basic courses in mathematics, physics, chemistry and geology. More attention has also been given to economics.

UNIVERSITY OF ILLINOIS
Urbana, Illinois

Department Heads: O. A. Leutwiler and R. F. Larson.
Petroleum Engineering Department Established: 1934.
Faculty: R. F. Larson, University of Illinois.
Number Graduates in 1938 Class: 9.
Number Graduates in 1939 Class: 15.
Number Enrolled in Department: Optional Course.
Number in Freshman Class: No Record.
Remarks: Recognizing a comparatively new and important field for the technically-trained engineer and anticipating a future development in this field within the state, the College of Engineering of the University of Illinois established in 1934 a series of new courses, comprising what is called the option in Petroleum Production Engineering, and offered these courses to the engineering students in 1935.

After a study of the problems of oil production, and the basic requirements for the petroleum engineer, the proposed curriculum was established as an option in the mechanical engineering curriculum. With necessary modifications, such as training in petroleum geology, added emphasis placed on surveying and fluid mechanics, and the addition of specialized courses dealing with the latest field development and production methods and equipment, the student is prepared for the unusual problems of the oil industry.

It is believed that the oil companies themselves can best administer the necessary practical training required in the form of several years at "rough-necking and roustabouting." Recognizing the futility of keeping up to date in laboratory work in oil field equipment, the plan has been, from the start, to adhere to basic fundamental engineering theory, and its application to oil production. Some laboratory work of a technical and research character dealing with special problems of the industry is to be added.

Enrollment in the new curriculum has grown steadily. Nine were graduated in 1938, while the 1939 class numbers 15. Registrations in the sophomore and junior classes, and interest shown among freshmen, indicate that future graduating classes will number 25 or more.

Students are urged to participate in summer employment in the oil fields. During November in the first semester of the senior year an extended inspection trip, covering all phases of the industry, is taken, the purpose of which is to give the student first-hand knowledge of the latest equipment and methods in use. Cooperation from the industry has been gratifying, indicating that the policy of sound technical theoretical training is well received.

THE UNIVERSITY OF KANSAS
Lawrence, Kansas

Department Head: Eugene A. Stephenson.
Petroleum Engineering Department Established: 1937.
Faculty: Eugene A. Stephenson, B.S. Adrian College, Ph.D. University of Chicago; Clinton M. Young, B.S. Hiram College, B.S. and E.M. Case School of Applied Science; John I. Moore, B.S. and M.S. Missouri School of Mines.
Number Graduates in Class of 1938: 3.
Number Graduates in Class of 1939: 3.
Number Enrolled in Department: 54.
Number in Freshman Class: 25.
Remarks: The course in petroleum engineering is devoted primarily to the development of oil and gas fields and the production of petroleum and natural gas. The theoretical principles involved are stressed throughout the curriculum, and the application of these principles is achieved by means of problems based on tests conducted in the field.

For those who expect to specialize in petroleum geology an optional course is offered wherein more credit hours in geology may be applied toward the bachelor's degree.

Students are required to have a broad training in the

A corner in the Petroleum Engineering Laboratory at the University of Kansas.

Engineering Hall, Louisiana State University. A new building for Geology and Petroleum Engineering is under construction. This school also has an oil field practically on the campus, where field conditions are observed.

fundamental sciences before they undertake the specialized engineering courses which come in the junior and senior years.

LOUISIANA STATE UNIVERSITY
Baton Rouge, Louisiana

Department Heads: Henry V. Howe and Benjamin C. Craft.
Petroleum Engineering Department Established: 1924.
Faculty: Benjamin C. Craft, A.B. and E.M. Stanford University; Sylvan Cromer, B.S. and M.S.E. University of Oklahoma.
Number Graduates in 1938 Class: 18
Number Graduates in 1939 Class: 23.
Number Enrolled in Department: 223.
Number in Freshman Class: 78.

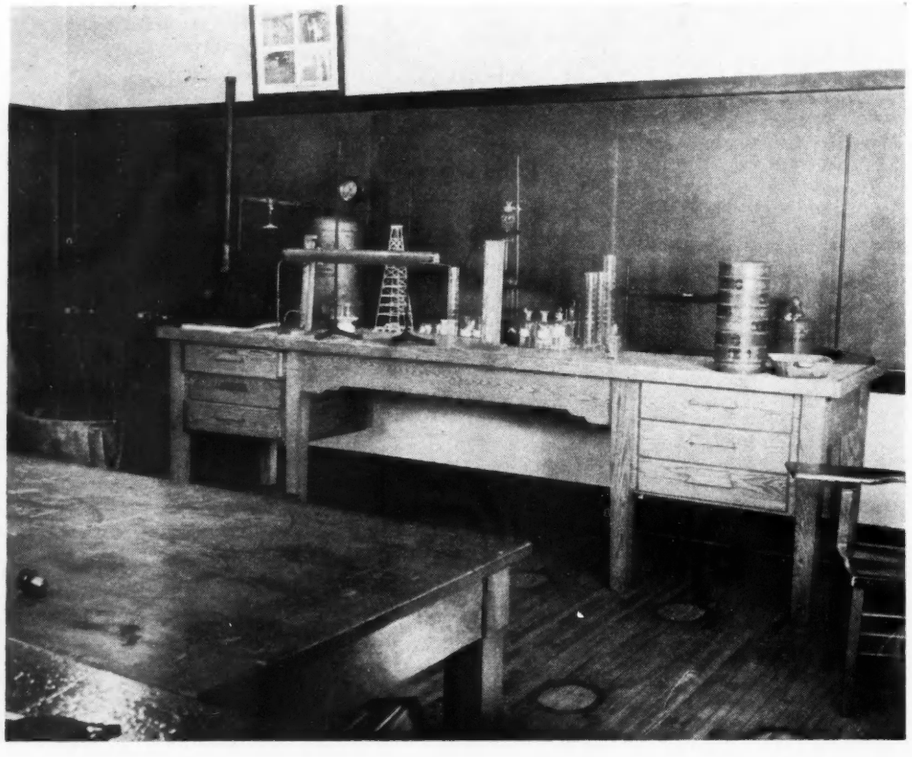
Remarks: The petroleum engineering laboratory is equipped to make complete analysis of drilling muds, which includes the various types of mud viscosimeters, filter press, pH meter and elutriation equipment. Experiments on core analysis include porosity, permeability, saturation, salt content, and analysis of grain size. Cements are tested for initial set and consistency by special equipment. Well surveying is demonstrated in the laboratory well using patented commercial equipment and acid bottle. Bottom-hole pressures are measured in the laboratory well. The measurement, sampling and testing of crude oil is demonstrated by flow tank, oil thief, centrifuge, and hydrometers.

Natural gas and gasoline experiments include the calibration of orifice meters, end point distillation, vapor pressure, gas gravity, and gas analysis.

The department is most fortunate in having the University oil field with flowing wells located one mile from the campus. Regular field trips enable the students to study drilling conditions and obtain cores, drilling mud, and oil samples for investigation in the laboratory. In addition the seniors take an annual field trip either to the North Louisiana fields to study the acidizing and repressuring problems in that area or visit one of the South Louisiana fields to study drilling and pumping barges and other conditions encountered in off-shore development.

UNIVERSITY OF MINNESOTA
Minneapolis, Minnesota

Department Head: E. H. Comstock.
Petroleum Engineering Department Established: 1928.
Faculty: E. H. Comstock, B.S. University of Wisconsin, M.S. University of Minnesota; Walter H. Parker, E.M. University of Minnesota; W. D. Lacabanne, B.S. and M.S. University of California; Wilfred W. Wetzel, B.A.



Corner of Petroleum Laboratory, School of Mines and Metallurgy, University of Minnesota.

School of Mines and Metallurgy Building, University of Minnesota.

University of Missouri, Ph.D. University of Minnesota.
Number Graduates in 1938 Class: 5.
Number Graduates in 1939 Class: 3.
Number Enrolled in Department: 9.
Number in Freshman Class: No record.

Remarks: The course in petroleum engineering at the University of Minnesota stresses the production side of the industry. Basic training includes thorough courses in mathematics, drafting, chemistry, physics, and geology, including, in particular, sedimentary deposits. It also includes surveying and mapping. The mechanical and electrical features of the various types of machinery used in the industry must be understood. A course in pipe lines gives the necessary preparation in flow formulas, soil corrosion, and methods of prevention. Thorough courses are included in prospecting, aerial surveying and interpreting aerial maps, oil field mapping, production technology, and petroleum economics. Due emphasis is also placed on problems of administration, including reports, leases, contracts, and specifications.

The department is supplied with samples of the smaller oil field equipment, well logs and electrical coring records, drill cores, models, maps, photographs, lantern slides, and samples of petroleum products. The lectures treat of location, prospecting, development, production, distribution, administration, leasing, mineral laws, safety work and safety regulations, and allied subjects affecting oil and gas production.

Laboratory work during the course covers the following subjects of special importance to the petroleum industry:

Metallography, the laboratory study of metals and alloys suitable for the exacting requirements of the industry.

Experimental study of special problems in production technology, such as porosity determinations, examination of drilling muds, oil-well cements, study of oil flow through sands under pressure, of gravity and water flooding forces, dehydration of emulsions, etc.

Theoretical study and field practice with methods of geophysical prospecting used in the petroleum industry.

Study of various processes and equipment used in the refining and manufacture of petroleum products.

Technology and tests of the physical properties of petroleum products and lubricants.

Field trips are required during the course. (1) A surveying trip to Northern Minnesota is taken during the summer following the sophomore year. (2) A field study of equipment, development, and production methods is made in the Mid-Continent, Gulf Coastal, or California oil fields preceeding the senior year. A detailed written report of observations made on this trip must be submitted.

Candidates for the degree of either geological, mining or petroleum engineering need not choose the field of specialization until the beginning of the junior year.

MISSOURI SCHOOL OF MINES AND METALLURGY
Rolla, Missouri

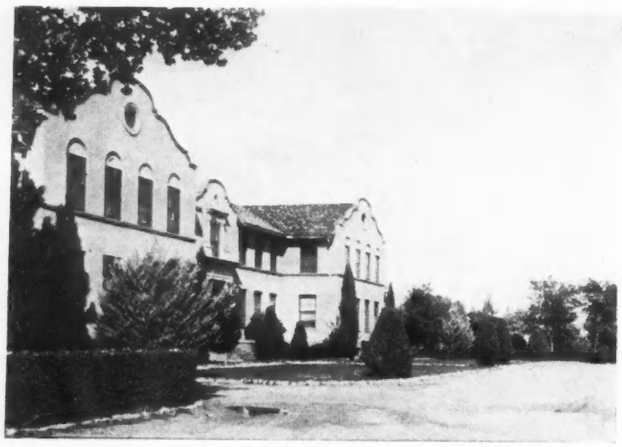
Department Head: Gilbert W. Noble.
Petroleum Engineering Department Established: 1920.
Faculty: Gilbert W. Noble, B.A. Harvard College; B.S., M.S. in mining engineering, and D.Sc. in mining engineering, Massachusetts Institute of Technology.
Number Graduates in 1938 Class: 9.
Number Graduates in 1939 Class: 17.
Number Enrolled in Department: 47.
Number in Freshman Class: 8. (See below.)

Remarks: Laboratory equipment for testing porosity, permeability, and screen analysis of oil sands, as well as equipment for testing physical properties of drilling muds.

Seniors take a field inspection trip of one week to 10 days duration, visiting producing fields in Kansas and Oklahoma. Juniors make one or more one- to two-day visits to drilling and producing fields in the Illinois basin.

A course in first aid is conducted by a representative of

Campus of Missouri School of Mines and Metallurgy. Department of Petroleum Engineering is housed in the building in the foreground.



Brown Hall, New Mexico School of Mines

the United States Bureau of Mines. Opportunity is given to all students to take the complete Bureau of Mines mine rescue course, or a shorter course in rescue training more directly along petroleum engineering or refining lines.

Definite selection of course and option need not be made before the junior year. At least double the present freshman enrollment should graduate in 1941.

NEW MEXICO SCHOOL OF MINES
Socorro, New Mexico

Department Head: G. Townsend Harley.
Petroleum Engineering Department Established: 1935.
Faculty: G. Townsend Harley, B.S. and E.M., New Mexico School of Mines.
Number Graduates in Class of 1938: 4.
Number Graduates in Class of 1939: 6.
Number Enrolled in Department: 7. (Seniors only.)
Number in Freshman Class: Course not determined until senior year.
Remarks: A new petroleum engineering building is being constructed on the campus, which will be complete with museum, library, drafting room and research laboratory, in addition to the regular space for classroom and office, and laboratories for regular courses in development, production and refining. All laboratories will be equipped with the latest and best equipment for testing and for the study of oil field problems.

The field trip in the past has consisted of a short visit to the southeastern New Mexico districts and to the refineries in El Paso, but in the future it is planned to include the major fields in Texas and Oklahoma.

Every effort is made to have all boys who graduate in petroleum engineering from New Mexico School of Mines placed in the industry during at least one summer vacation, and preferably during two summers, in order to gain experience, and it is hoped that in the near future, at least one summer of work will be a requirement for graduation.

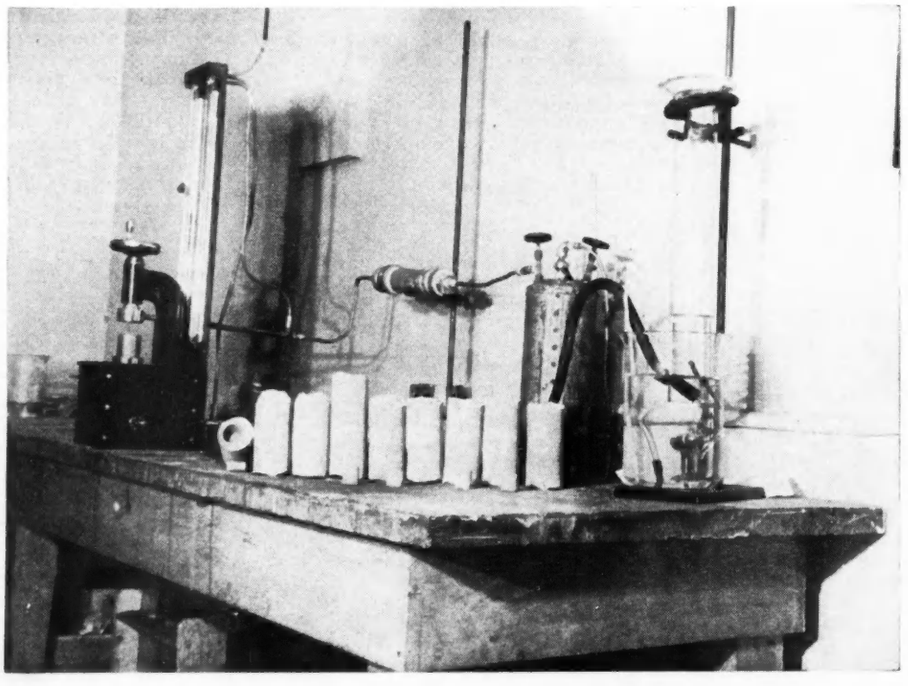
The first three years of work at this school are designed to give a thorough general engineering training to the student, and this is followed by the fourth year in which he takes up all of the strictly professional work for the petroleum engineer's degree. The courses for the senior year include: Oil field development, oil field production, oil and gas transportation, refinery engineering, accounting and administration, costs and valuation, petroleum laboratory 1 (development), petroleum laboratory 2 (production), and petroleum laboratory 4 (special problems).

THE OHIO STATE UNIVERSITY
Columbus, Ohio

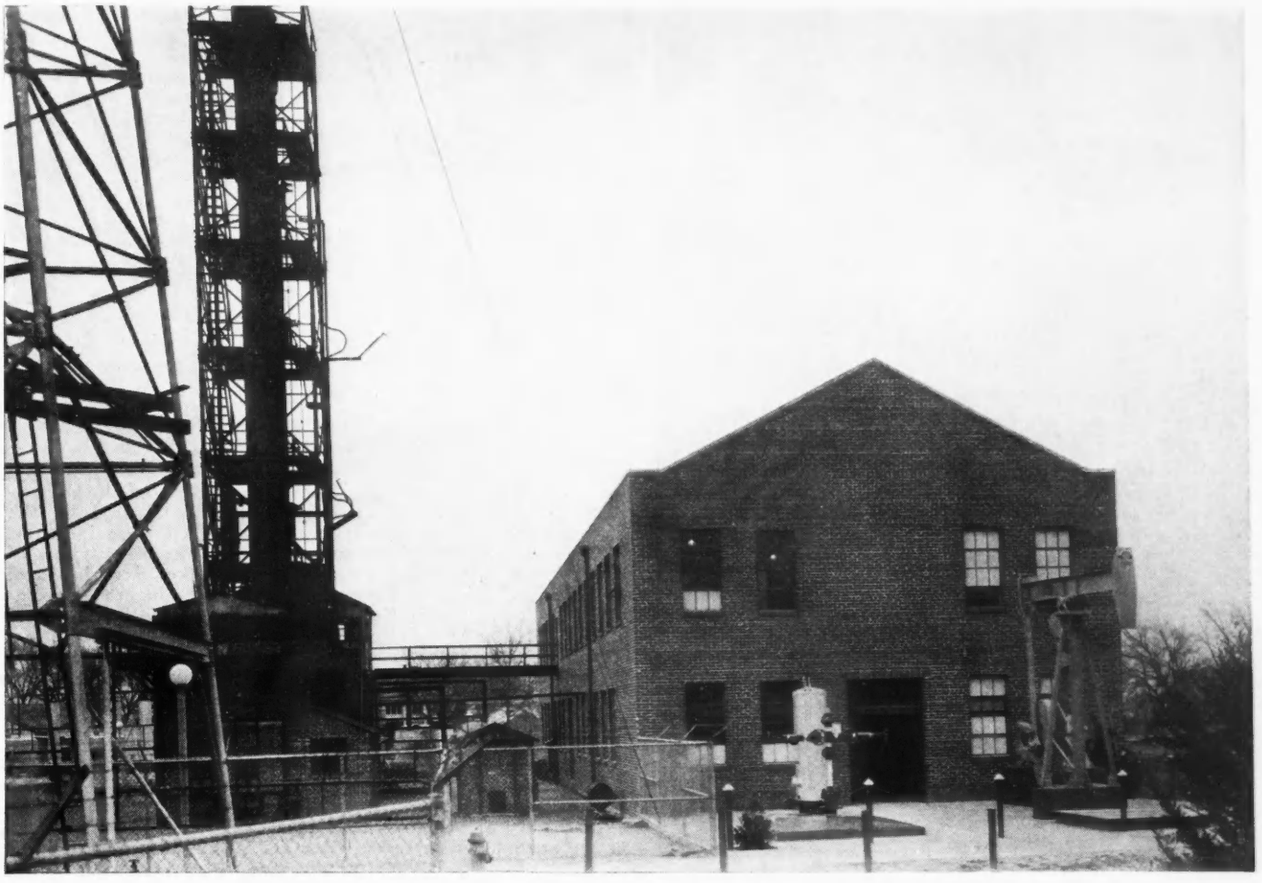
Department Head: E. V. O'Rourke.
Petroleum Engineering Department Established: 1925.
Faculty: E. V. O'Rourke, B.E.M. Ohio State University; W. J. McCaughey, B.S. University of Pennsylvania, Ph.D. George Washington University; P. W. Ott, B.S. University of Illinois, M.S. Ohio State University; B. C. Freeman, B.A. McMaster University, Ph.D. University of Chicago; H. W. Kuhn, B.S. Ohio State University, Ph.D. Cornell University; F. W. Marquis, B.S. and M.E. University of Illinois; E. E. Dreese, M.S., B.S., and E.E. (doctorate) University of Michigan; Jacob B. Taylor, B.S. University of Pennsylvania, M.A. University of North Dakota; H. E. Nold, E.M. Ohio State University.
Number Graduates in 1938 Class: 7.
Number Graduates in 1939 Class: 6.
Number Enrolled in Department: 25.
Number in Freshman Class: Course available to seniors and graduate students.
Remarks: Offerings in courses in petroleum engineering were begun in the fall of 1925. A separate department has never been established but there is a distinct curriculum. The degree given is that of Mining Engineer. The school attempts to give a fundamental engineering education and take up enough work in both laboratory and class room along petroleum engineering lines that will enable the students to obtain a foothold in the industry.

The petroleum engineering courses are made available to seniors and graduate students in other departments. This has resulted in a number of students outside the department equal to those in the department. Most of the students who have finished the petroleum enginering course are now associatd in some line of petroleum engineering.

Equipment is available for making tests for saturation,



Permeability apparatus in laboratory of The Ohio State University.



Petroleum Engineering Laboratory, showing refinery, gas-lift, derrick and 500-foot experimental pumping well at the University of Oklahoma at Norman.

porosity, permeability, viscosity, centrifuge, gravity, analysis of crudes, and examination of cores and cuttings.

An inspection trip is taken to petroleum producing fields. The trip usually lasts about one week. Students are required to make the inspection trip at the end of the junior year.

UNIVERSITY OF OKLAHOMA
Norman, Oklahoma

Department Head: W. H. Carson.
Petroleum Engineering Department Established: 1924.
Faculty: W. H. Carson, M.E. University of Wisconsin; W. F. Cloud, M.S. University of Oklahoma; R. L. Huntington, Ph.D. University of Michigan; J. W. Donnell, M.S. University of Oklahoma; W. C. Bednar, B.S. University of Oklahoma; G. M. Stearns, B.S. University of Oklahoma; E. M. Sims, M.S. Texas A. & M. College.
Number Graduates in 1938 Class: 40.
Number Graduates in 1939 Class: 45.
Number Enrolled in Department: 663.
Number in Freshman Class: 232.
Remarks: Practically all of the first three years of the required four-year curriculum for petroleum engineers is devoted to a study of the fundamentals and principles of physics, chemistry, mathematics, mechanics, geology, and economics. The curriculum for the senior year consists almost entirely of specialized petroleum courses which deal with the application of these fundamental principles to the problems of the petroleum industry.

The men on the petroleum engineering faculty not only have an educational background in engineering, but have had actual experience in petroleum industry including work in drilling, production, natural gas, natural gasoline plants, refineries, pipe lines, and field laboratories.

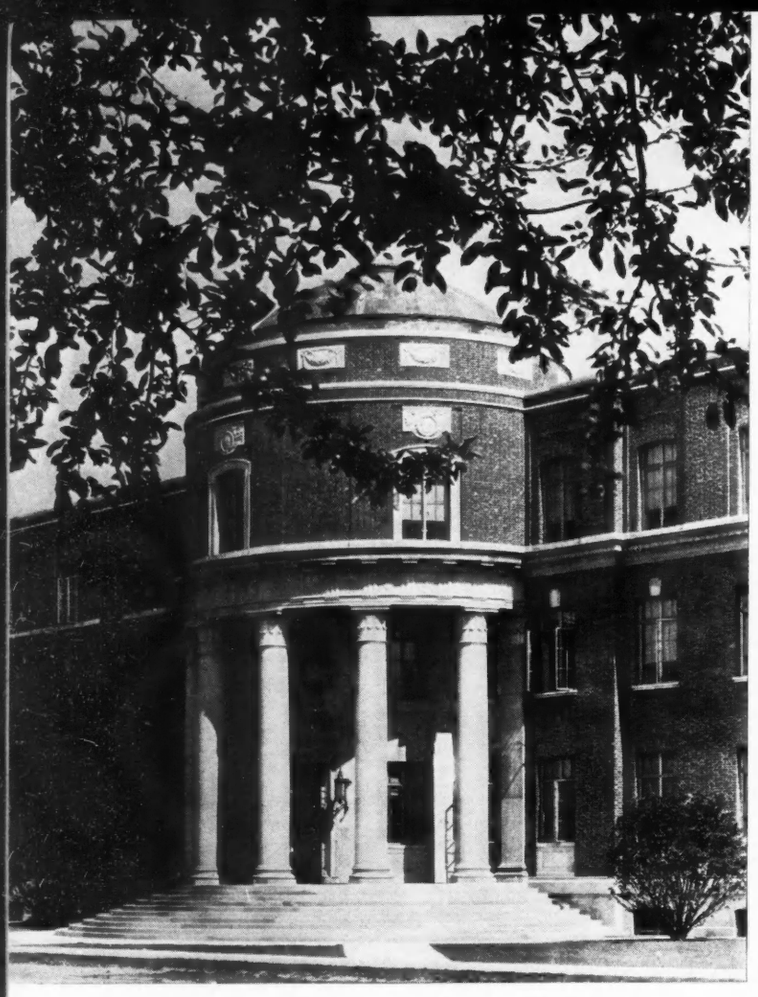
The larger items of petroleum equipment which are used in connection with instruction are:

1. A complete 250-barrel per day distillation unit.
2. A complete set-up of two oil-field boilers with auxiliary equipment.
3. A 500-foot experimental well equipped with a standard oil field pumping unit driven by an electric motor.
4. A complete lubricating oil treating and dewaxing plant.
5. Gas measurement laboratory including various types of meters, regulators, etc.
6. Production laboratory equipped for: (1) study of porosity, permeability and saturation of oil sands; (2) experimental work with rotary muds; (3) testing and study of crude emulsions and oil field brines; (4) analyzing oil and gas separation in stages; and (5) studying the flow of oil and gas through porous reservoirs.
7. A 94-foot derrick, used for experimental gas-lift and flow column densities.

In connection with the petroleum engineering courses, classes are often taken on field trips to drilling wells, producing wells, natural gasoline plants, or other similar places to observe particular practical phases of the petroleum industry. The Oklahoma City field and the Moore field offer excellent opportunities for such field trips since both are within 20 miles of the university. Many of the petroleum engineering students work in these fields while attending school or during summer vacation.

THE PENNSYLVANIA STATE COLLEGE
State College, Pennsylvania

Department Head: Sylvain Pirson.
Petroleum Engineering Department Established: 1929.
Faculty: Sylvain Pirson, E.M. and C.E. University of Louvain, M.S. University of Pittsburgh, D.S. Colorado School of Mines; Samuel Terrill Yuster, B.S. North Dakota State College, Ph.D. University of Minnesota; Francis Cartwright Todd, B.S. Oklahoma A. & M. College, M.S. Carnegie Institute of Technology, Ph.D. University of Chicago; Harry Krutter, B.S., M.S. and Ph.D. Massachusetts Institute of Technology; Kurt Hendrik Andersen, Dipl. Ing. and Dr. Ing. Technische Hochschule of



Entrance to the School of Mineral Industries, Pennsylvania State College, where the Petroleum and Natural Gas Laboratories are located.

Berlin; Clifford Reifsnider Horn, P.E. Colorado School of Mines; Luther Trauger Bissey, B.S. Pennsylvania State College; Henry Beecher Charmbury, B.A. Gettysburg College, M.S. University of Pittsburgh; John C. Calhoun, Jr., B.S. Pennsylvania State College; Robert J. Day, B.S. Union College; Maynard Moody Stephens, B.A., M.A. and Ph.D. University of Minnesota.

Number Graduates in Class of 1938: 8.
Number Graduates in Class of 1939: 14.
Number Enrolled in Department: 79.
Number in Freshman Class: 20.

Remarks: At the Pennsylvania State College there are four main divisions in the field of work in petroleum and natural gas engineering: i.e., resident instruction, research, extension, and correspondence instruction.

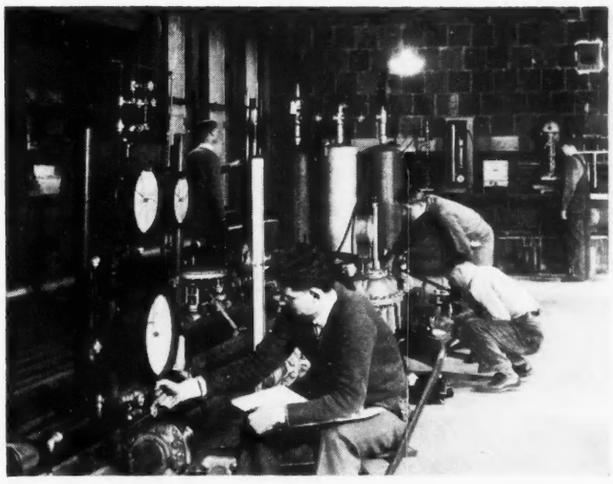
1. Resident instruction has for its function the education of future petroleum and natural gas engineers and equips the graduates for filling positions in the various fields of activity in the petroleum industry. Graduate courses are also available in which emphasis is placed more particularly upon the methods of secondary recovery of petroleum.

2. Research is a very important function of the department and the various subjects are investigated by the members of the staff in cooperation with the industry. The various organizations contributing to the support of research in petroleum and natural gas engineering are: Bradford District Pennsylvania Oil Producers Association, Pennsylvania Grade Crude Oil Association, Natural Gas Men's Association, and American Gas Association. Water flooding, production of oil by gas drive and measurement of humidity in natural gas are projects that receive a large part of the faculty's time.

3. The Extension Division of the Petroleum and Natural Gas Department is in charge of Dr. M. M. Stephens who organizes and supervises the instruction in the various centers where night classes are held. Extension work covers petroleum production, petroleum refining, and natural gas production. Text books are available to cover material in these three fields. The aim of extension work is to reach the employees of various companies who have not had more than the average high school education, and the text book material is prepared accordingly. Regular night classes in petroleum and natural gas are held in ten counties of Pennsylvania under the supervision of the division.

4. Correspondence instruction is given in a limited

Research Laboratory at Pennsylvania State College.



Metering Division of the Natural Gas Laboratory at the University of Pittsburgh.

number of cases under the direction of the extension division.

THE UNIVERSITY OF PITTSBURGH
Pittsburgh, Pennsylvania

Department Head: R. E. Sherrill.

Petroleum Engineering Department Established: 1912.

Faculty: R. E. Sherrill, B.S. Washington & Lee University, M.S. and Ph.D. Cornell University; G. L. Yates, B.S. in P.E. and M.S. in M.E. Oklahoma University; Bernard E. Curran, B.S. in P.E. University of Pittsburgh. In addition to the above full-time faculty members, instruction in special courses is offered periodically by lecturers from the oil and gas industry. During the school year 1937-38, lecturers who each taught one course for a semester were: H. C. Cooper, president Hope Natural Gas Company; C. B. McClintock, consulting petroleum engineer; L. L. Nettleton, geophysicist, Gulf Research and Development Company.

Number Graduates in 1938 Class: 18.

Number Graduates in 1939 Class: 20.

Number Enrolled in Department: 115.

Number in Freshman Class: 29.

Remarks: The University of Pittsburgh School of Mines was one of the first institutions to recognize and meet the need of educating men especially for the oil and gas industry. While the initial emphasis was on geological subjects, the department now offers complete curricula leading to degrees in petroleum geology and natural gas engineering. In addition to well equipped laboratories in each of the above fields, a petroleum refinery is also maintained.

Specialization in the particular field chosen by the student is developed only after he has been thoroughly grounded in fundamental science and engineering. A required course entitled "Reservoir Engineering" has just been added to the curriculum. This course comprises the application of geologic, hydrodynamic and thermodynamic principles to scientific production methods. Periodically instruction in other special subjects is offered by industrial leaders.

Location of the university is an asset, permitting association with key men in the oil, natural gas and allied industries. This association is afforded primarily in weekly group meetings with these men. All students are required to attend these sessions during their four years at the university.

Regular field trips through industrial plants, research laboratories and the Appalachian oil and gas fields constitute a part of the program. Surveying and field geology are given at a permanent summer camp located near Windber, Pennsylvania, in the Allegheny Mountains.

STANFORD UNIVERSITY
Stanford University, California

Department Head: Frederick G. Tickell.

Petroleum Engineering Department Established: 1919.

Faculty: Frederick G. Tickell, B.S. and E.M. University of California; Walter J Crook, B.A. and E.M. Stanford University, Dr. Eng. Bucharest; Charles A. Dobbel, B.A. Stanford University; O. Cutler Shepard, B.A. and E.M. Stanford University.

Number Graduates in 1938 Class: 10.

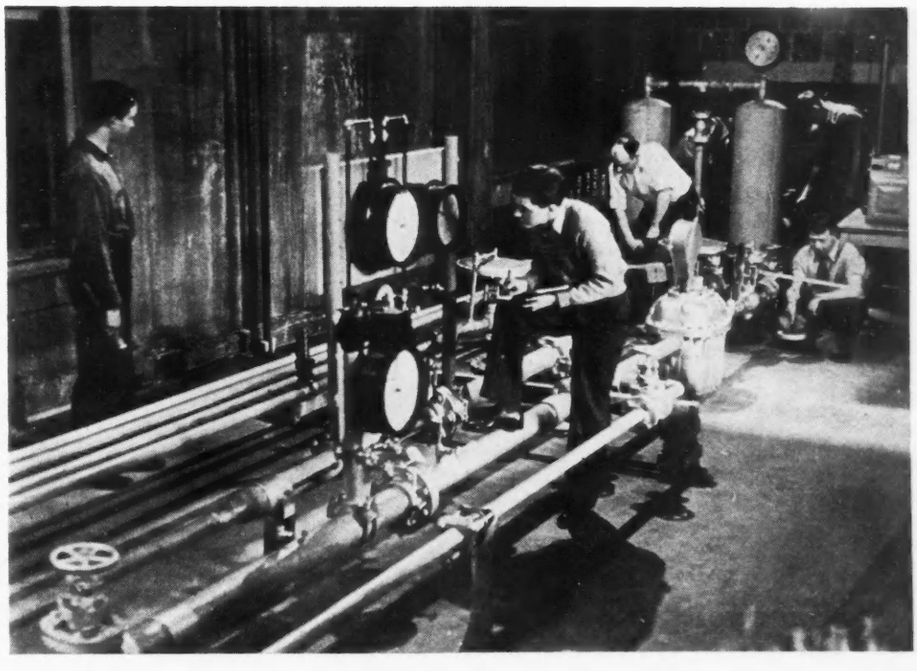
Number Graduates in 1939 Class: 12.

Number Enrolled in Department: 20.

Number in Freshman Class: Undergraduates are not registered in department. (See below.)

Remarks: Petroleum engineering is a division of the Department of Mining Engineering. Previous to 1919 it was the Department of Geology and Mining. Actual petroleum engineering courses were first given in 1919.

Petroleum engineering majors must first satisfy the



Another view of students at work in the Natural Gas Laboratory at the University of Pittsburgh.

substantial equivalent of the curriculum prescribed by the School of Engineering. The elective units (38 quarter-units) of that curriculum may be taken largely in the physical sciences (including geology), together with some petroleum engineering specialization. The two years of graduate study, leading the degree of Engineer in Petroleum Engineering, embrace specialized studies in petroleum engineering and advanced courses in engineering and the physical sciences. The presentation of a thesis on some aspect of the petroleum field thereupon leads to the granting of the engineer's degree. In general, the department requires a high technical and scientific content of its curriculum and, at the same time, recommends a broadly diversified course in preference to a narrowly specialized one. The emphasis is upon broad general culture, thorough scientific foundation, and late specialization.

Courses in petroleum engineering are broad and chiefly include:

Principles of Petroleum Mining; a comprehensive course, covering the whole subject of petroleum exploitation. It includes properties, origin, accumulation, and occurrence of petroleum; valuation, development, and production of oil properties; storage, transportation, testing, refining, and utilization of petroleum and its products.

Testing of Fuels and Lubricants; a lecture and laboratory course, including many of the standard tests made on crude petroleum and refined products.

Petroleum Engineering; a course in the application of engineering principles to the solution of underground problems in the oil field.

Oil Field Development and Production; a course dealing with the equipment and methods used in drilling oil wells and in the production therefrom.

Storage and Transportation of Petroleum; methods of gauging, design of tanks and pipe lines, prevention of losses, fire hazards, and fluid metering.

Petroleum Refining and Utilization.

Oil Land Valuation.

Oil Field Sediments; a laboratory course in the mechanical analysis of sediments as to grain size, porosity, permeability, mineral and fluid content.

Advanced Work in Petroleum Engineering; special problems in any of the above subjects.

The laboratories are fully equipped except for some of the operations of refinery practice. The curriculum is based more upon the problems of the oil field than of the refinery. Testing methods, however, are fully covered. There are occasional conducted trips to oil fields and equipment factories. A summer course in field geology is given.

Undergraduates are not registered in any department. Freshmen and sophomores are in the "lower division," juniors and seniors in the "engineering school." Only partial specialization is permitted to undergraduates, and the student is fully specialized only after two years of graduate work in a department.

Stanford University is the only school in the country where petroleum engineering is a graduate course. The engineer's degree is granted after two years of graduate work. In the "Petroleum Division," about half the four-year graduates go on for graduate work.

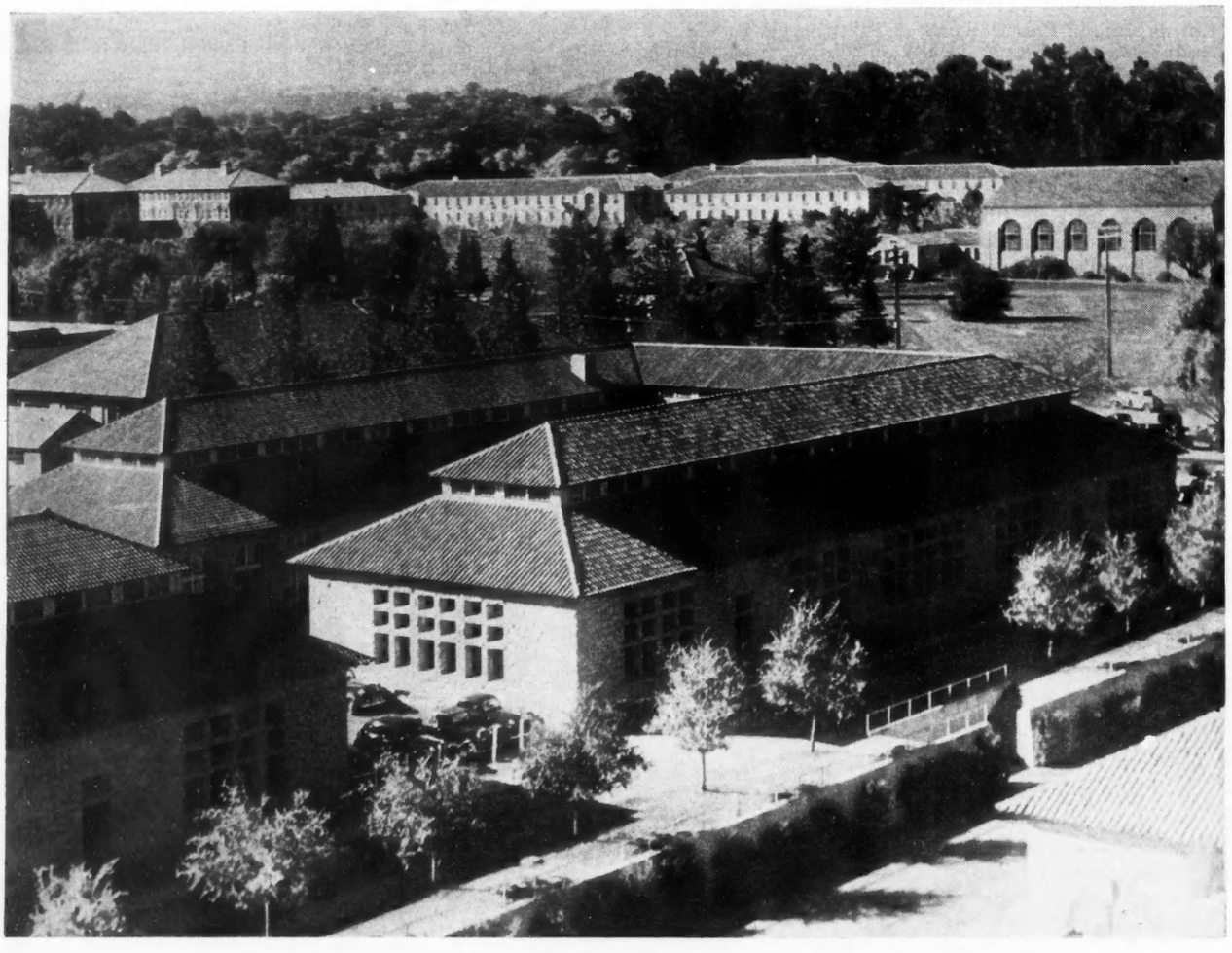
TEXAS AGRICULTURAL AND MECHANICAL COLLEGE

College Station, Texas

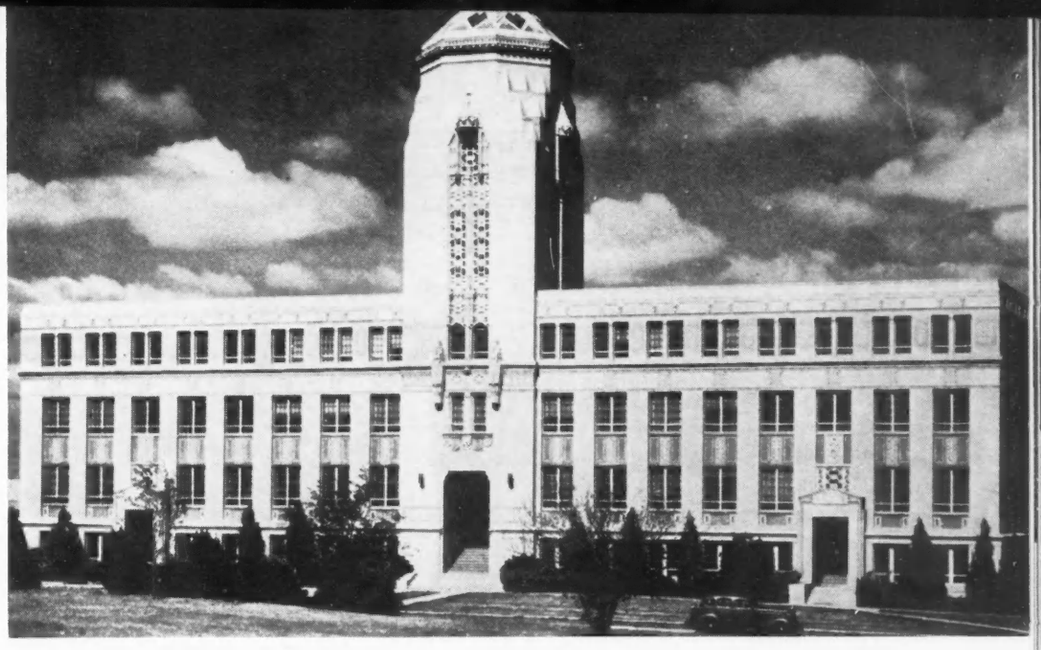
Department Head: Harold Vance.

Petroleum Engineering Department Established: 1929.

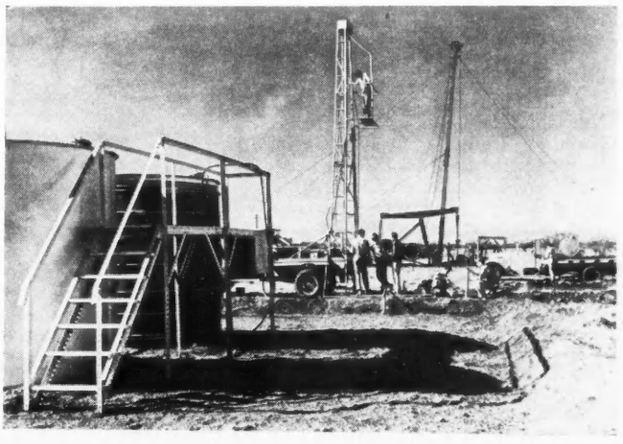
Faculty: Harold Vance, B.S. in P.E. University of California; A. B. Stevens, B.S. in P.E. University of California, M.S. in P.E. University of Southern California; J. P. Hays, B.S. in P.E. University of California; H. E. Gross,



Mining, Metallurgy and Petroleum Building (in foreground), Stanford University



Petroleum Engineering Building and (below) Outdoor Laboratory at A. & M. College of Texas.



B.S. in Mining Engineering Missouri School of Mines, M.S. in Mining Engineering University of Illinois, E.M. Missouri School of Mines.

Number Graduates in 1938 Class: 45.
Number Graduates in 1939 Class: 74.
Number Enrolled in Department: 808.
Number in Freshman Class: 373.
Remarks: Four separate courses are available in petroleum engineering at this college. First, a four-year course leading to a degree of Bachelor of Science in Petroleum Engineering, and, second, three five-year courses leading to degrees in Petroleum Engineering. One five-year course is designed primarily for students interested in research. This course contains all of the courses given in the four-year petroleum engineering curriculum and, in addition, more advanced work in physics and chemistry which are not included in the four-year course. This course leads to a degree of Bachelor of Petroleum Engineering.

The second five-year course, titled Five-Year Course in Petroleum Engineering, geological option, includes all courses given in the four-year petroleum engineering curriculum and all the geology courses given in the four-year geology curriculum. On completion of this course, the student receives a degree of Bachelor of Petroleum Engineering (geological option).

A third five-year course was made available to students in the term 1938-1939. This course contains all of the subjects given in the four-year petroleum engineering course, and all of the subjects given in the four-year mechanical engineering course. Upon completion of the required work, the student receives a degree of Bachelor of Science in Petroleum Engineering and a degree of Bachelor of Science in Mechanical Engineering.

The Petroleum Engineering Department and the Geology Department are housed in the Petroleum Engineering Building. All departmental class rooms and laboratories are located in this building. The laboratories consist of an oil-testing laboratory, a complete gas laboratory, a production laboratory, and a development laboratory. And, recently, a special mud-fluid laboratory has been added to the department. A completely equipped core-testing laboratory is made a part of the production laboratory.

An outdoor laboratory containing about four acres is in the process of development.

The Petroleum Engineering Department possesses its own library.

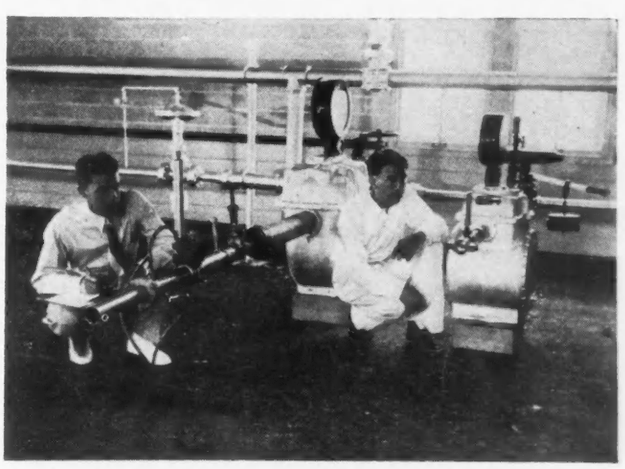
TEXAS COLLEGE OF ARTS AND INDUSTRIES
Kingsville, Texas

Department Head: R. L. Peurifoy.
Petroleum Engineering Department Established: 1935. (Natural Gas Engineering only.)
Faculty: Frank H. Dotterweich, Ph.D. Johns Hopkins; W. M. Richtmann, M.S. University of Wisconsin.
Number Graduates in 1938 Class: 10.
Number Graduates in 1939 Class: 13.
Number Enrolled in Department: 33. (Juniors and seniors only.)
Number in Freshman Class: No differentation in first year.
Remarks: The Texas College of Arts and Industries claims a number of advantages in offering the course in natural gas engineering. Among these are:

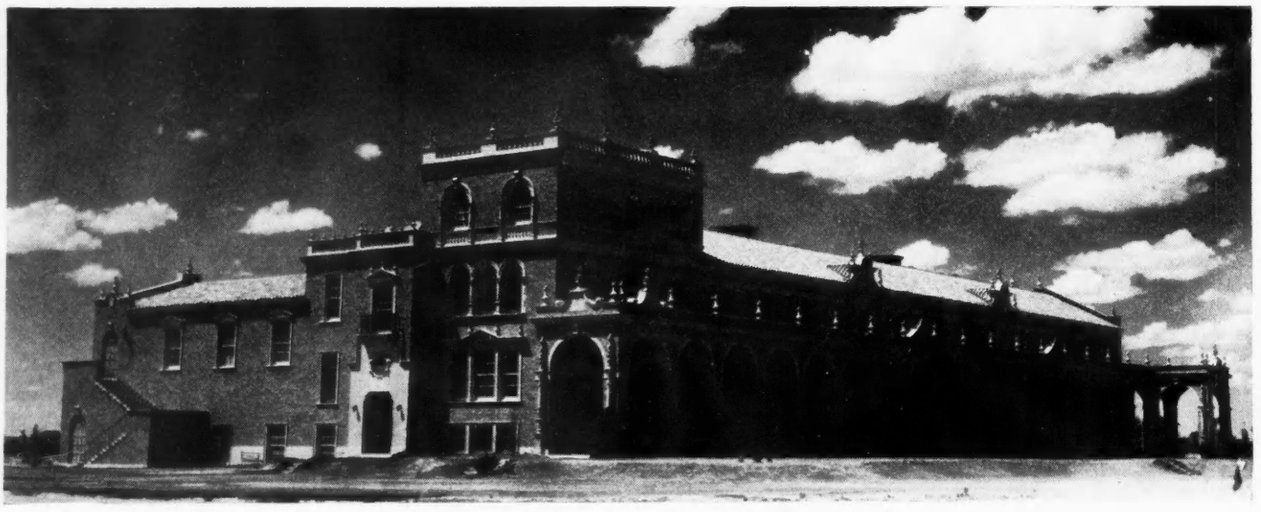
1. An active advisory committee consisting of persons chosen from most of the larger gas utilities of the state, to work with us in offering the course.

2. Easy access to a number of gas producing fields, transmission lines, compressor stations, distribution systems, etc., all of which are used extensively in connection with laboratory exercises.

3. An excellently equipped natural gas engineering laboratory where model transmission, measurement, distribu-



Natural Gas Engineering Laboratory work at Texas College of Arts and Industries.



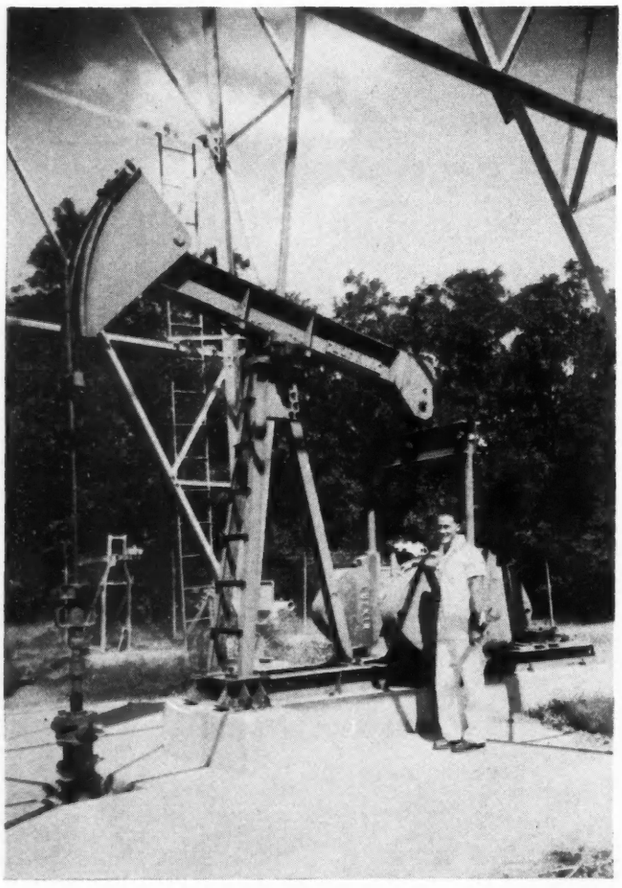
Texas Technological College at Lubbock

tion and analysis may be duplicated or practiced easily and accurately.

4. Summer employment for advanced undergraduate gas engineering students, through the courtesy of various gas companies and state agencies.

TEXAS TECHNOLOGICAL COLLEGE
Lubbock, Texas

Department Head: Leroy T. Patton.
Petroleum Engineering Department Established: 1937.
Faculty: Leroy T. Patton, A.B. Muskingum College, B.S. University of Chicago, M.S. and Ph.D. University of Iowa; Merrill A. Stainbrook, A.B., M.S. and Ph.D. University of Iowa; Wilbur I. Robinson, B.S. and M.S. University of Michigan, Ph.D. Yale College; Raymond G. Sidwell, B.A., M.A. and Ph.D. University of Iowa; Waldo S. Glock, A.B. Iowa, Ph.D. Yale College.
Number Graduates in 1938 Class: 4.
Number Graduates in 1939 Class: 10.
Number Enrolled in Department: 158.
Number in Freshman Class: 88.
Remarks: Petroleum engineering in this institution has been an outgrowth and expansion of the work in geology and because of the intimate relationship to geology the work in petroleum engineering and geology is organized under one department. The curriculum in petroleum engineering contains two options, geology option and geophysics option. These options offer such fundamental training in engineering subjects in geology as is needed to prepare students for work with the oil companies. Beginning with the fall of 1939 it is proposed to add a third option, petroleum production, in which specialized courses in engineering problems peculiar to the work of producing oil from known and proven fields will be offered. A staff member or members trained in these specialized branches of engineering will be added to care for this part of the work. The department of geology and geological engineering was established in 1925. In 1937 this was changed to geology and engineering.



Experimental pumping well, Department of Petroleum Engineering, University of Texas.

THE UNIVERSITY OF TEXAS
Austin, Texas

Department Head: H. H. Power.
Petroleum Engineering Department Established: 1928.
Faculty: H. H. Power, M.S. University of California; F. B. Plummer, M.S. Dartmouth; George Y. McCoy, B.S. University of Kansas; A. E. Sweeney, Jr., B.S. United States Naval Academy; G. H. Fancher, D.S. Colorado School of Mines.
Number Graduates in 1938 Class: 35.
Number Graduates in 1939 Class: 60.
Number Enrolled in Department: 544.
Number in Freshman Class: 203.
Remarks: The course in petroleum engineering at The University of Texas has been designed to give fundamental training in the application of mathematics, physics, chemistry, and geology to development problems, and to the production, transportation, measurement and storage of petroleum, natural gas, and natural gasoline.

The curriculum provides for a four-year course leading to the degree of Bachelor of Science in Petroleum Engineering, with an additional year of post graduate study leading to the degree of Master of Science in Petroleum Engineering. Opportunities are also afforded in advanced studies and research to suit the individual requirements. Students of unusual promise are advised to pursue the year of post graduate study beyond the usual four-year curriculum. Students in petroleum engineering are advised and encouraged to find employment during one or more summers with oil and gas companies.

The various courses include a general engineering

Engineering Building, University of Texas, at Austin.

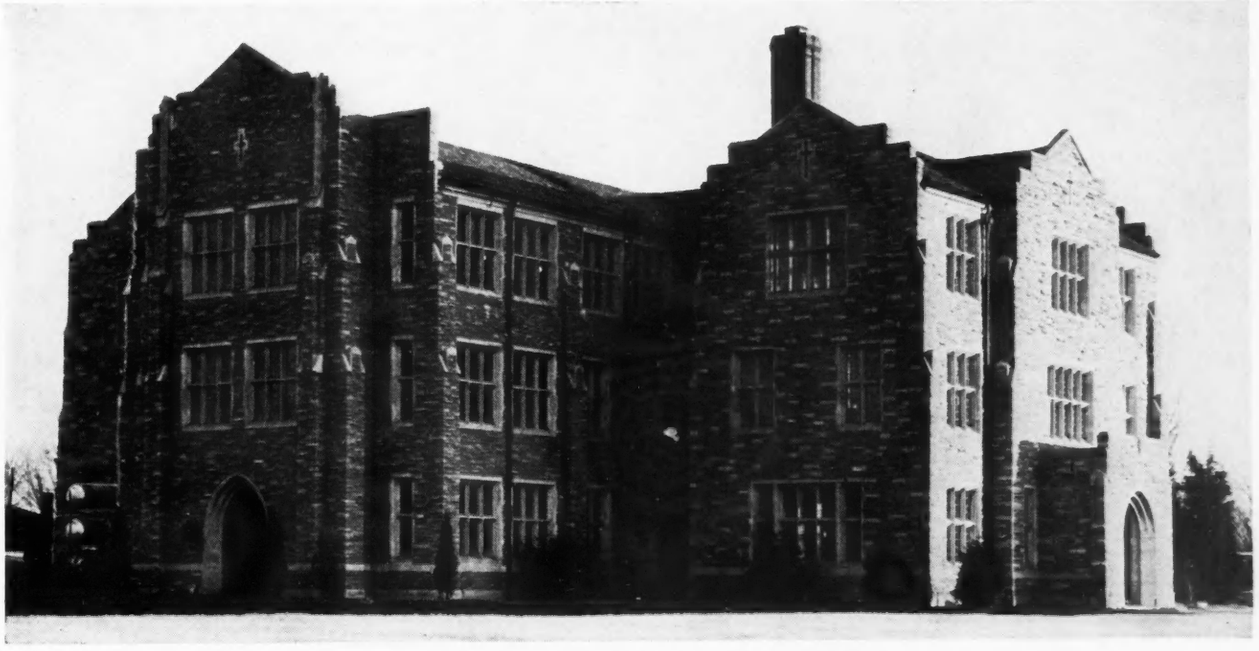
course, which must be completed in the student's first year in the college; petroleum-production methods, an introductory review of petroleum technology; petroleum engineering laboratory, a course covering the chemical and physical characteristics of petroleum and natural gas, mud fluids, emulsions, porosity, saturation, and permeability of sands and cores; production engineering, with the application of the fundamental sciences to develop problems, and to the production, transportation and storage of petroleum, natural gas, and natural gasoline; petroleum engineering practice, a study of drilling and production methods in selected oil fields of Texas; oil-field problems, a laboratory and manual course; gas-production engineering; valuation of oil and gas properties; junior seminar; senior seminar; inspection trips; fluid reservoirs; research problems; a study of recent literature on petroleum-production practice and petroleum-engineering problems; thesis course for master's degree.

THE UNIVERSITY OF TULSA
Tulsa, Oklahoma

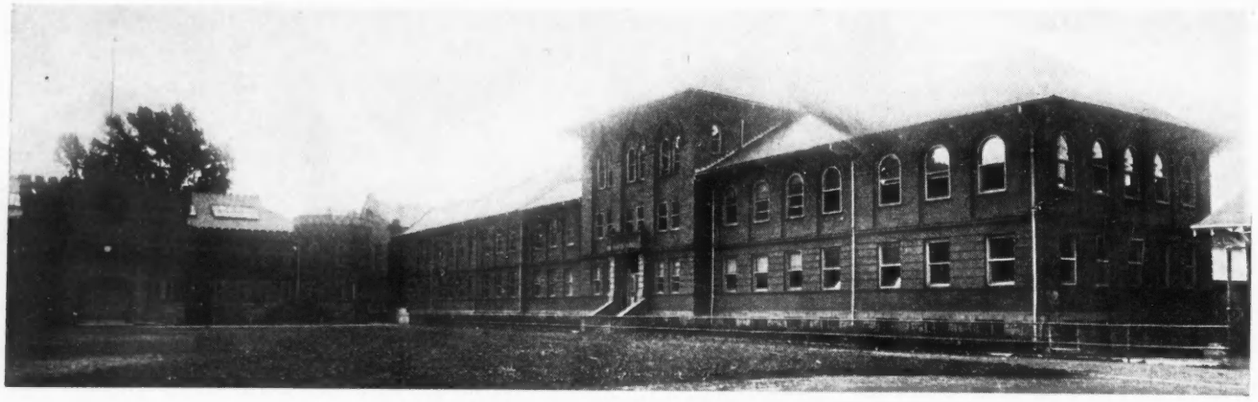
Department Head: R. L. Langenheim.
Petroleum Engineering Department Established: 1928.
Faculty: Dean R. L. Langenheim, C.E. University of Cincinnati; W. L. Nelson, B.S. and M.S. University of Michigan; Thomas C. Frick, B.S. in P.E. University of Tulsa; Sidney Born, B.A. and Ph.D. Columbia University; James A. Johnston, B.S. in Ch.E. Texas A. & M. College, M.S. and Ph.D. in Ch.E. Iowa State College; W. S. Foster, B.S. in E.E. Virginia Polytechnic Institute, M.A. College of William and Mary; Charles Klotz, B.A. Albion College, B.S.E. and M.S.E. University of Michigan.
Number Graduates in 1938 Class: 8.
Number Graduates in 1939 Class: 20.
Number Enrolled in Department: 264.
Number in Freshman Class: 101.
Remarks: The engineering school of the university is devoted exclusively to the teaching of petroleum engineering in the various branches of production, geology, chemistry and refining. With this restriction in the field of efforts it is possible to direct the students' attention and to organize a sequence of subjects, so that a comprehensive knowledge of the petroleum industry can be gained in four years. In addition, a year of graduate work is offered in the fields of geology and petroleum refining.

The university is situated in the center of a great oil producing area. Knowledge of large scale equipment is easily gained in the shops of the various oil supply houses, at the International Petroleum Exposition, and by the Cooperative Plan of Education followed in the engineering school. The last year of engineering is conducted by the cooperative plan of education, by which the student attends school for two months and then works for two months in the employ of some oil company in actual field or plant employment.

The university provides a sound training in fundamental



Engineering Building at The University of Tulsa



Mechanical Hall at West Virginia University

engineering, and the student does not approach specialized studies until he has mastered the fundamentals of general engineering. Only freshmen particularly fitted for the work are admitted, the enrollment in the freshman class being limited to 120 per year by special examination.

Some of the high points of the course are:

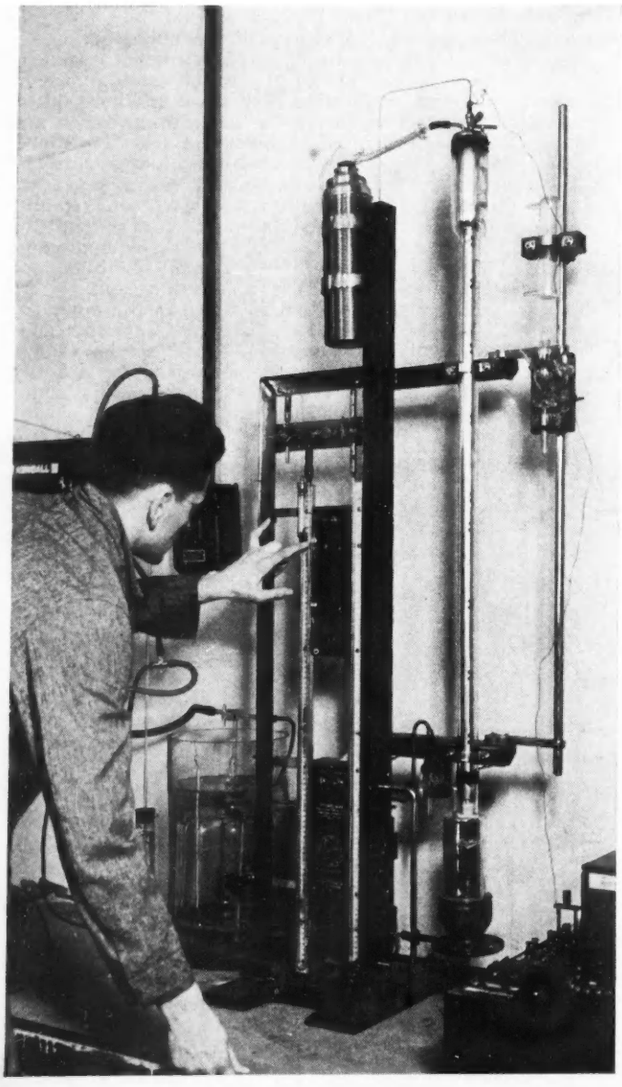
1. Production Laboratory—Routine tests on porosity and permeability of oil sands, and the percent oil and water saturation of oil sands. For conducting these tests a Boyle's Law porosimeter and a permeameter of the university's own design is used. Both retorts and extractors for determining oil and water content of sands are used.

Routine tests on drilling muds such as viscosity (Marsh Funnel), wall building properties, Ph value, and weight.

Special work is done in the field making dynamometer tests of pumping wells. The school purchased a dynagraph and by special permission some oil companies allow tests on their pumping wells.

2. Natural Gas Laboratory—Determining the specific gravity of gas, testing positive meters, testing orifice meters, and determining the open flow of gas wells with a Pitot tube and orifice well tester are the routine tests performed. Special problems on regulators, differential valves, and instruments are given to the students.

Other than the necessary fundamentals of physics, mathematics, geology, and chemistry, all production students take courses in fluid mechanics, heat and power, engineering economics, and physical chemistry. Specialized courses in production are drilling and development, petroleum production methods, petroleum production engineering, and petroleum geology. Drilling and development covers exploration methods, cable and rotary drilling methods, casing, coring, cementing, and well completion. Petroleum-production methods covers control of flowing wells, gas lift, pumping wells, secondary-recovery methods (water flooding and repressuring), oil and gas separation, oil-field emulsions, and salt-water disposal. Petroleum production engineering is primarily a design course. It covers the selection and design of tubing, rods, bottom-hole pumps, and pumping jacks. Tanks, separators, and treators are considered. Problems on repressuring projects and performance of oil-field reservoirs are given in this course. Petroleum geology covers the occurrence of petroleum, and problems of petroleum geology.



Analysis of Natural Gas by Low-Temperature Fractionation in the Student Laboratory of Pennsylvania State College.

WEST VIRGINIA UNIVERSITY
Morgantown, West Virginia

Department Head: C. E. Lawall.
Petroleum Engineering Department Established: 1916.
Faculty: C. E. Lawall, E.M. and M.S. Lehigh University; William Staab, E.M. Lehigh University.
Number Graduates in 1938 Class: 3.
Number Graduates in 1939 Class: 6.
Number Enrolled in Department: 34.
Number in Freshman Class: 12.
Remarks: West Virginia University was one of the first schools in this country offering a course in oil and gas engineering. The curriculum offers a strong basic foundation in engineering subjects branching out in the last two years to the geological, chemical and production courses of the subject. The school is located in the center of old oil- and gas-producing fields, which are available for inspection trips and field study. New developments in these fields are now bringing productions from deeper horizons.

Reprints Available

Reprints of the foregoing article on petroleum engineering schools are avialable in an attractive 16-page pamphlet at 25 cents per copy. Only a limited number have been printed, and purchases will be filled in order of their arrival.

Small Holes Lower Cost of Exploration

By BRAD MILLS, Associate Editor

SMALL hole drilling, regarded a year ago as an experimental operating practice, has become an accepted exploratory medium in both deep and shallow producing areas. Completion of deep "slim" holes along the Gulf Coast and adaptation of the practice in shallower Mid-Continent fields have filled definite needs in districts that require different types of development. Interest in this type of drilling has reached South America, where exploratory work along the United States line will be attempted.

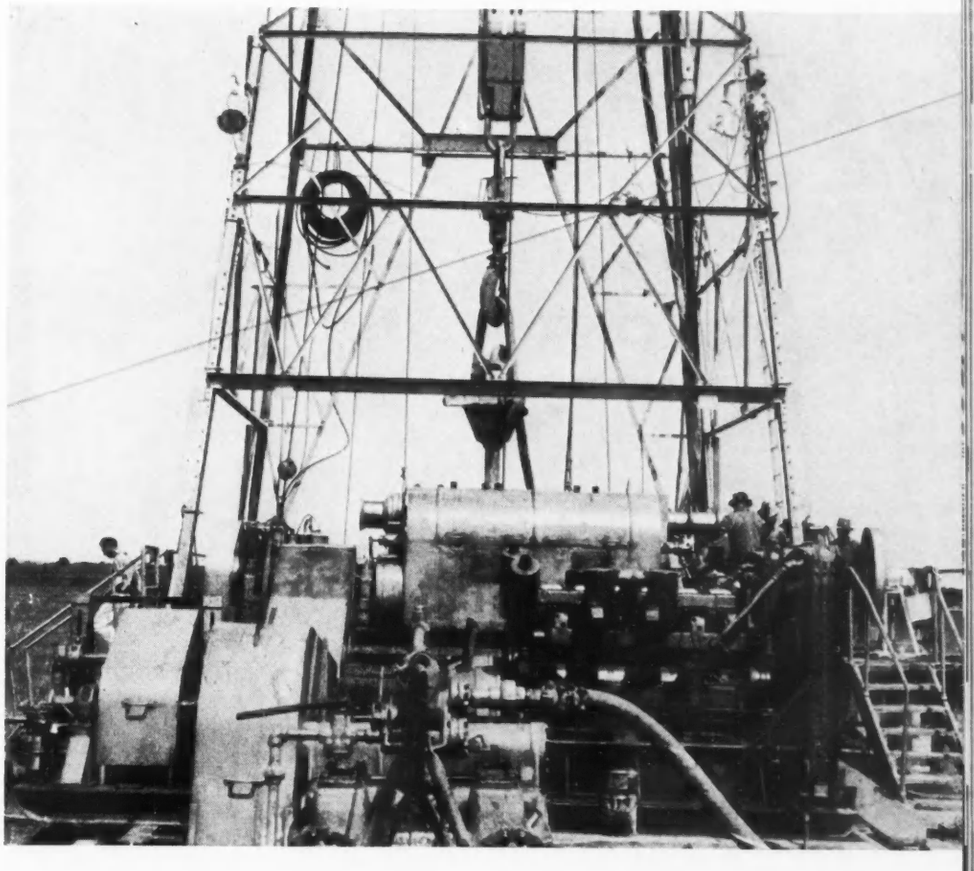
Despite the preference for smaller holes, in principle slim hole adherents have compromised by drilling slightly larger holes than were advocated originally. This tempering of a new practice was not unexpected, since the first deep wells of small diameter were largely experimental tests. In some areas an increase of one inch in diameter has removed the chief difficulty encountered in the smaller holes.

Not a Panacea

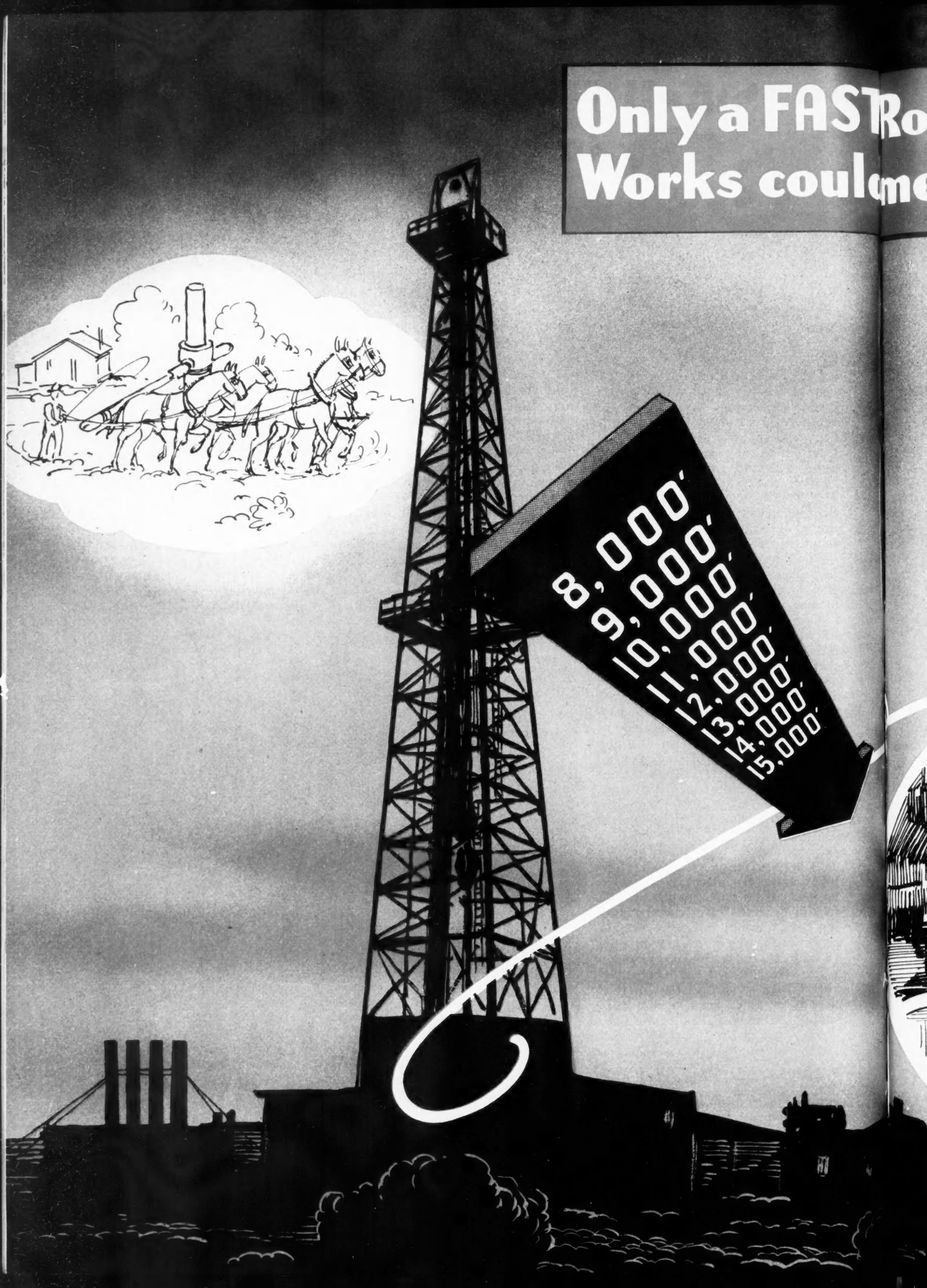
Slim hole drilling should not be considered a cure for all development evils. An attempt to drill a very small hole to a depth of 9000 feet in a South Louisiana producing field was not satisfactory. Several complications developed below 7000 feet, and actual completion work was finished with considerable difficulty. Production in that field is obtained from a very thin sand, and the complicated mechanical maneuvering necessary to complete a well in this field was carried out at greater expense and longer time than had been recorded in completion of larger holes at about 9000 feet. It is believed, however, that a hole one inch larger on bottom would have given better results, while remaining within the limits of the so-called "slim hole" classification.

Where cementing requirements are exact, production is deep, and drilling conditions severe, small hole drilling in its strict sense may not be effective. The larger hole gives more leeway in case of trouble and permits freer action in cementing operations.

The deep "slim" holes now being drilled along the Texas-Louisiana Gulf Coast are an extreme adaptation of the old "core hole" of 10 years ago. Instead of drilling to 1000 feet, operators are now drilling to 7000 and 8000 feet to obtain geological information in a short time. The equipment and methods have been changed to test deep markers that were not known during the earlier development period. The necessity for moving in heavy



This small-hole drilling outfit has been used continuously along the Gulf Coast for almost a year, and averages about 10,000 feet per month when no long moves are made.


Only a FAST
Works coul
8,000'
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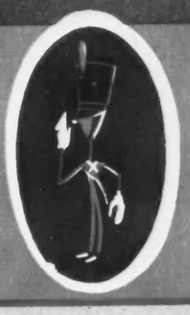
ST Rotary and a MODERN Draw lmeet to-day's Drilling Needs



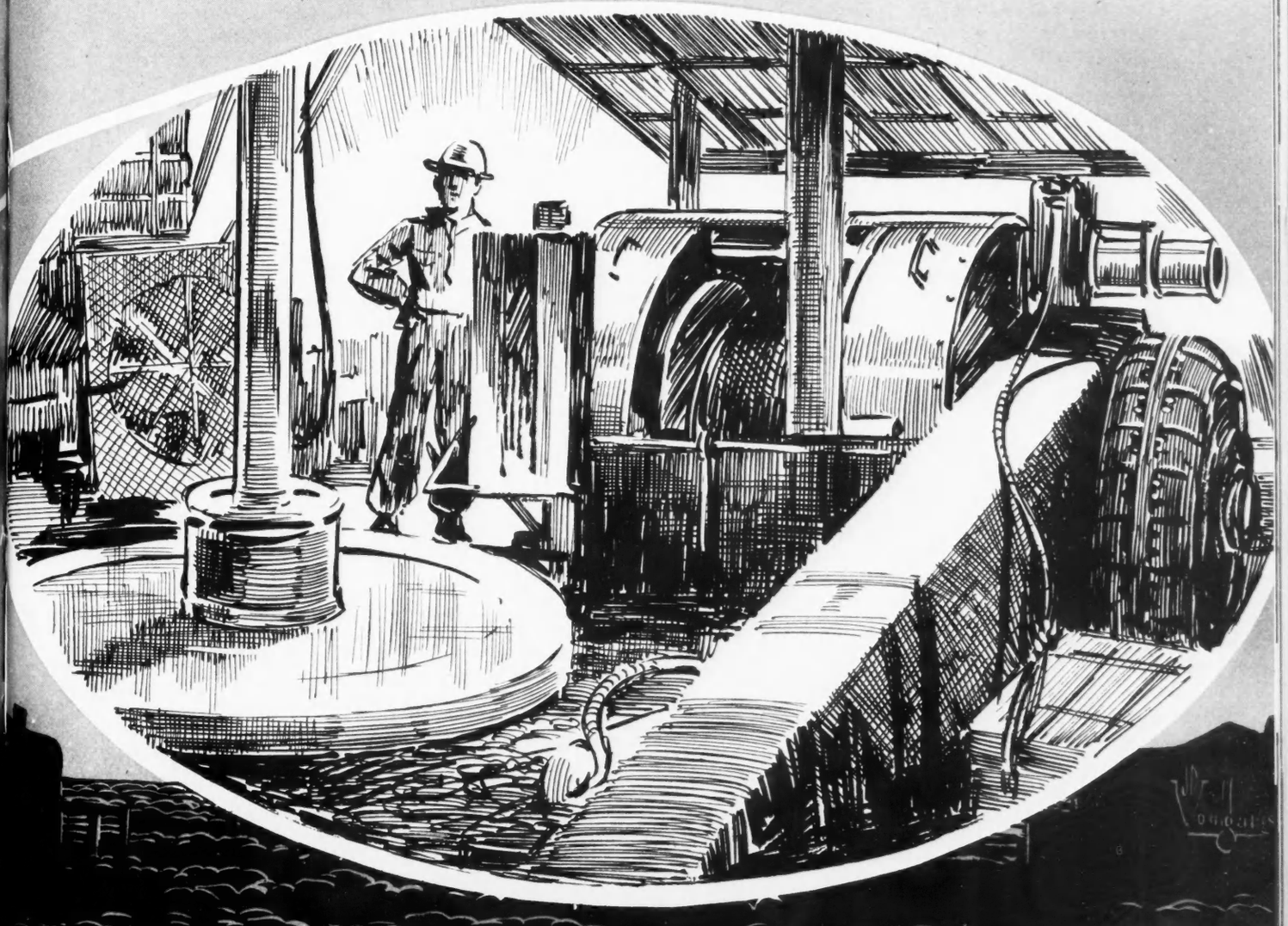
The miracle of the modern age has been the development of the Oil Industry — particularly the Producing Industry. The Rotary method of drilling has justifiably been given credit for making this unparalleled progress possible.

Early in this century the "Rotary" made its bow to the Oil Fraternity in Corsicana in the form of a piece of pipe with a bit screwed on bottom — and a team of mules furnishing the "Power." Hole depths were a few hundred feet. Some 38 years later — in California, hole was completed to 15,004 feet. In this record achievement, the fact that the majority of equipment used was standard testifies to the progressive policies of manufacturers serving the producing industry.

Today's deep drilling success is *made* possible because of improved equipment. Especially is this true in regards to the Rotary, the Draw works and the Power Plant.

As a fellow manufacturer, who for 30 years has been privileged to serve the Producing Industry, Hughes Tool Company compliments the manufacturers of Rotaries, Draw works and Power units for their successful and unceasing efforts to extend frontiers of petroleum — outward and downward.

HUGHES TOOL COMPANY, HOUSTON, TEXAS, U.S.A.



wildcatting equipment has been met with lighter equipment that serves the preliminary purpose. The heavy standard rotary equipment still is the accepted operating medium, following favorable indications developed by the lighter small hole equipment.

Gulf Coast Practice

Gulf Coast practice has been to drill from one to three deep exploratory tests in areas under consideration. The geological departments follow these preliminary operations closely, and one well may give the needed information. Where there is a desire to check dip and closure, two or three wells may be drilled.

Small exploratory holes may be used to advantage to test wildcat areas lying between fields, or in general areas where the depth to important markers is fairly well established. The position of such markers in areas under consideration has an important bearing on potentialities of the wildcat acreage. The small exploratory hole must serve as a definite correlating medium of formations opened to fulfill its mission.

Costs of Slim Holes

It may be said that the primary objective in small-hole drilling is the development of geological facts at reduced cost. It is much more expensive to drill a large hole than a small one, yet a small hole in the earth may yield effective clues as to the identity of formations. The cost per foot for small-hole drilling averages about $2.00 for the 5000- to 8000-foot wells drilled along the Gulf Coast, while the cost range may be placed from $1.50 to $3.00. One drilling contractor recently offered to drill small exploratory holes to 7000 feet for $2.00 per foot. The two major companies now doing most of this type of drilling in the district have not yet contracted work, but any reliable drilling contractor could carry it out. Formations encountered and location of wells are factors affecting drilling costs.

Pure Oil Company has helped to pioneer small-hole drilling along the Gulf Coast, but has modified its program and equipment standards somewhat. This company first drilled a 6¾-inch hole below the surface casing, but now drills a 7¾-inch hole after cementing the short surface string. The larger hole has given better results because of the need for a heavier drill collar than was used with the smaller hole. Several small exploratory holes have been drilled, the deepest having been stopped at 8300 feet. With the 7¾-inch hole it is possible to use about 90 feet of 6¼-inch drill collar. This arrangement gives sufficient "natural" weight on the bit without excess weight on the drill pipe.

Exploitation Slim Hole

The company is now drilling an 8⅝-inch semi-slim hole to 7400 feet for completion as an oil well in a proven field. In this well about 1500 feet of 9⅝-inch casing was run. The intermediate size hole was a compromise between the very small exploratory hole and the large hole that formerly was drilled in the field.

In the regular small hole drilled for exploratory purposes, the company has been setting about 1500 feet of 8⅝-inch casing, and continuing to bottom with 7¾-inch hole.

Pure Oil Company has kept excellent records on various phases of drilling operations, particularly on the mechanical aspects of hole-making. In the average Gulf Coast well, about 10 cubic feet of formation is removed hourly during actual drilling effort. This average includes progress in all formations, but the speed range obviously is wide. The removal of 10 cubic feet per hour in a 6¼-inch hole would give four times the drilling speed made in a 12½-inch hole, all factors being even, but the correspondingly greater speed should hardly be expected in the smaller hole. The formation removed in a large hole completed recently totaled 14,000 cubic feet. The cubic content of formations removed in a slim hole of similar depth would be less than a third as much, and the drilling speed perhaps twice as great.

The company has found the removal of formation to be fairly constant in holes of every size, where equipment is adequate for maximum operating conditions. From this experience it is not logical to assume that light, makeshift drilling outfits used in exploratory work can remove as much formation as the heavy drilling outfits. Only where adequate circulation is maintained and the surface equipment meets full requirements will the small hole be able to compare with the larger hole in the amount of formation removed. In its small-hole drilling program, this company has used equipment that permitted drilling the formations at a rapid rate.

For Determining Lease Values

Small-hole drilling can be done at from a third to a fifth of the cost of large holes, where development of geological data is the principal objective. These comparisons are based on costs established in Gulf Coast operations.

Where a company has a large undrilled acreage on which rentals are paid, the value of such leases may be determined at low cost, and rentals stopped on questionable tracts. Wells may be drilled to 7500 feet in less than half the time required for a large wildcat hole.

From three to five wells often are required to prove or condemn a salt dome prospect, and it has not been unusual to spend $500,000 in such an effort with heavy equipment. With a small-hole drilling outfit, four deep exploratory holes may be drilled for $100,000 or less.

The small hole probably responds better to the electrical logging device than the larger hole, a factor one company holds important. Since the porosity and resistivity measure of the electrical logging instrument is most effective near the instrument itself, it is reasonable to assume that records obtained in a small hole are representative.

It is possible to drill 10,000 feet per month with a small-hole outfit, where activity is confined to a local area and where the terrain is favorable. Greater footage might be possible under ideal conditions. Drilling time lost between the completion of one exploratory test and the beginning of another ranges from one or two days, as compared with a loss of several days with heavy wildcat drilling outfits.

One company depends largely upon the electrical log for its determinations, but another cores religiously at regular intervals and catches samples every 30 feet. The "raw" hole is logged electrically in every case before abandonment, as a positive check against cores and samples obtained during drilling.

Miscellaneous Costs

The bit cost with slim-hole drilling has been about five percent of the total cost, and the mud cost has been even less in several wells. Drill pipe, pump and power costs are correspondingly low for the average well of this type.

Humble Oil & Refining Company

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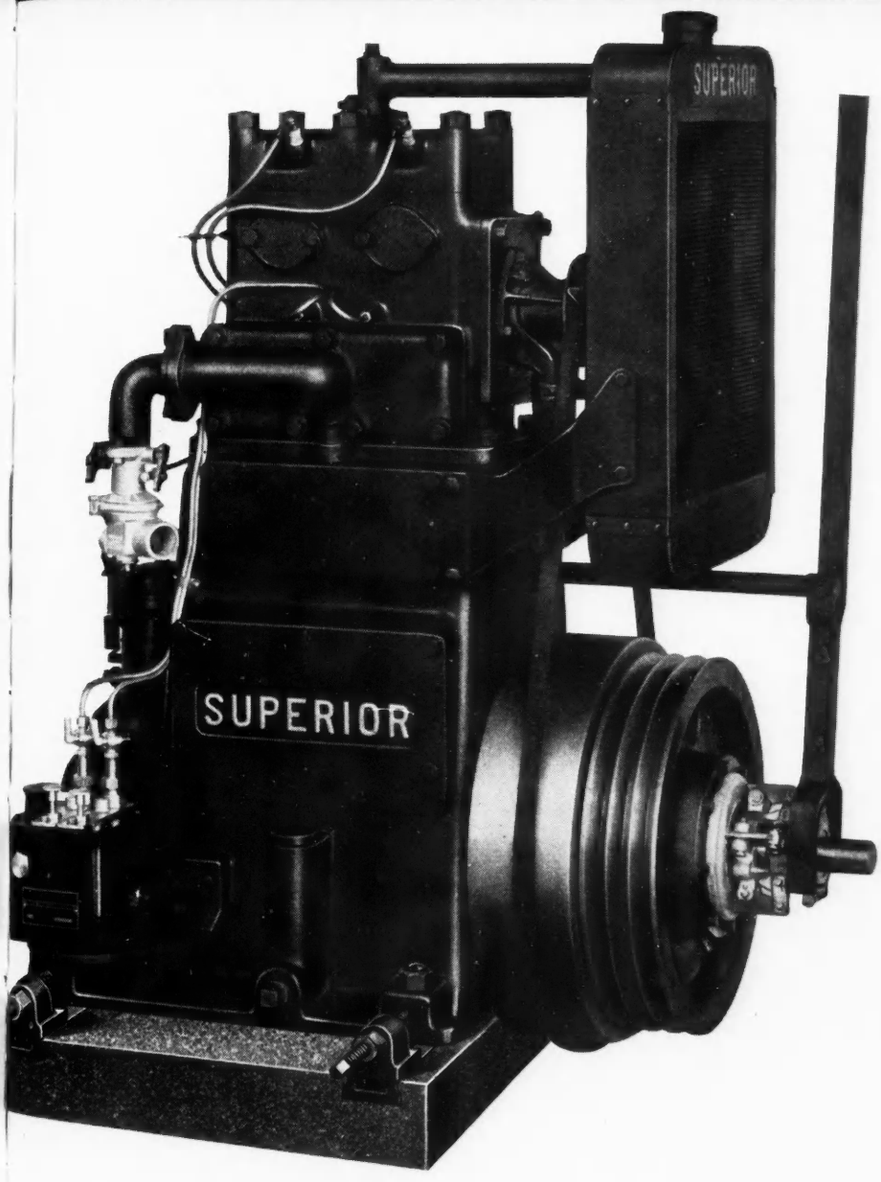
UP TO 10 H. P. AT 400 TO 700 R. P. M.



A twin cylinder crosshead type 2 cycle gas engine, suitable for light pumping wells, of design closely resembling its bigger brothers in the Superior line.

Smooth, uniform power.

Easy starting.

Does not eat oil—cuts lube expense.

Conservatively rated—nearly 50% surplus.

Simple—easy to keep up.

Requires little attention.

Durable—long life.

Complete with clutch, water pump, and radiator.

Costs no more to install than a high speed engine.

Ratings: 10 hp. at 700 and 7 hp. at 500 rpm.

THE NATIONAL SUPPLY COMPANY

EXECUTIVE OFFICES: PITTSBURGH, PA.
GENERAL SALES OFFICE: TOLEDO, OHIO

DIVISION OFFICES: FT. WORTH, TEXAS; TULSA, OKLA.; TORRANCE, CALIF.

has used small-hole drilling to advantage for exploratory work along the Gulf Coast. This company has been active in the preliminary testing of large blocks of acreage where additional information was desired. All wells of this nature have been drilled strictly as exploratory or deep "core hole" tests in wildcat areas, and none was intended to develop oil or gas production. The deepest test drilled along the Gulf Coast by this company was carried to 8000 feet. One well may give the necessary information, but three deep exploratory holes were drilled in one small area in Wharton County, Texas. Samples are taken at frequent intervals and the hole is electrically logged before abandonment.

This company now is drilling a 6¾-inch hole below the surface casing, having increased the size from 6¼ inches in the original wells. The use of 3½-inch, internal flush drill pipe has done much to reduce the friction loss that was present in the 2⅞-inch drill pipe originally used. The increased drill pipe size and larger diameter of the hole have materially increased the drilling speed. The use of a 7⅝-inch surface casing string has replaced the 7-inch casing used during the first part of the program. This larger surface string is run to about 1000 feet and cemented from bottom to the surface. Two joints of 9⅝-inch casing are used on top of the smaller string to give more freedom in surface operations. The full cementing of the surface string has proved a valuable safety factor on a few occasions.

Gulf Coast formations are well suited to open-hole drilling below the surface casing, but other districts might be as successfully drilled in the same manner. Since the wells are drilled as exploratory tests, the use of only a surface casing string is an important consideration.

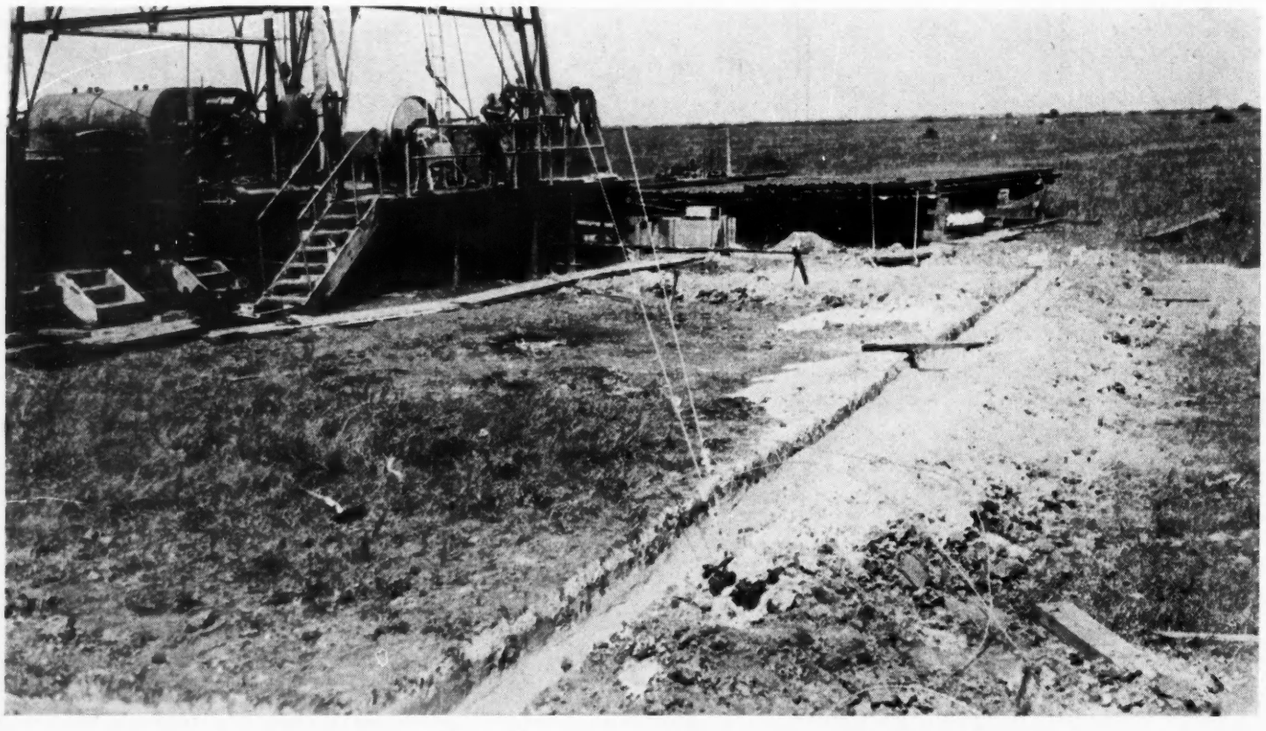
Equipment Used

The equipment best suited for drilling small and deep exploratory holes is the light rotary outfit that offers a full margin of safety, high portability, and ease of assembly. Such equipment may be either conventional rotary or portable rotary drilling machines. Gulf Coast operators use light rotary outfits with special prime movers and unit arrangement of auxiliary equipment. The rotary drilling principle is carried out in full, however.

Equipment originally used for drilling exploratory "core holes" was light and carried a questionable safety factor. The present equipment is heavy enough to keep a hole under control at any reasonable pressure encountered, and is adapted to making hole at a rapid rate.

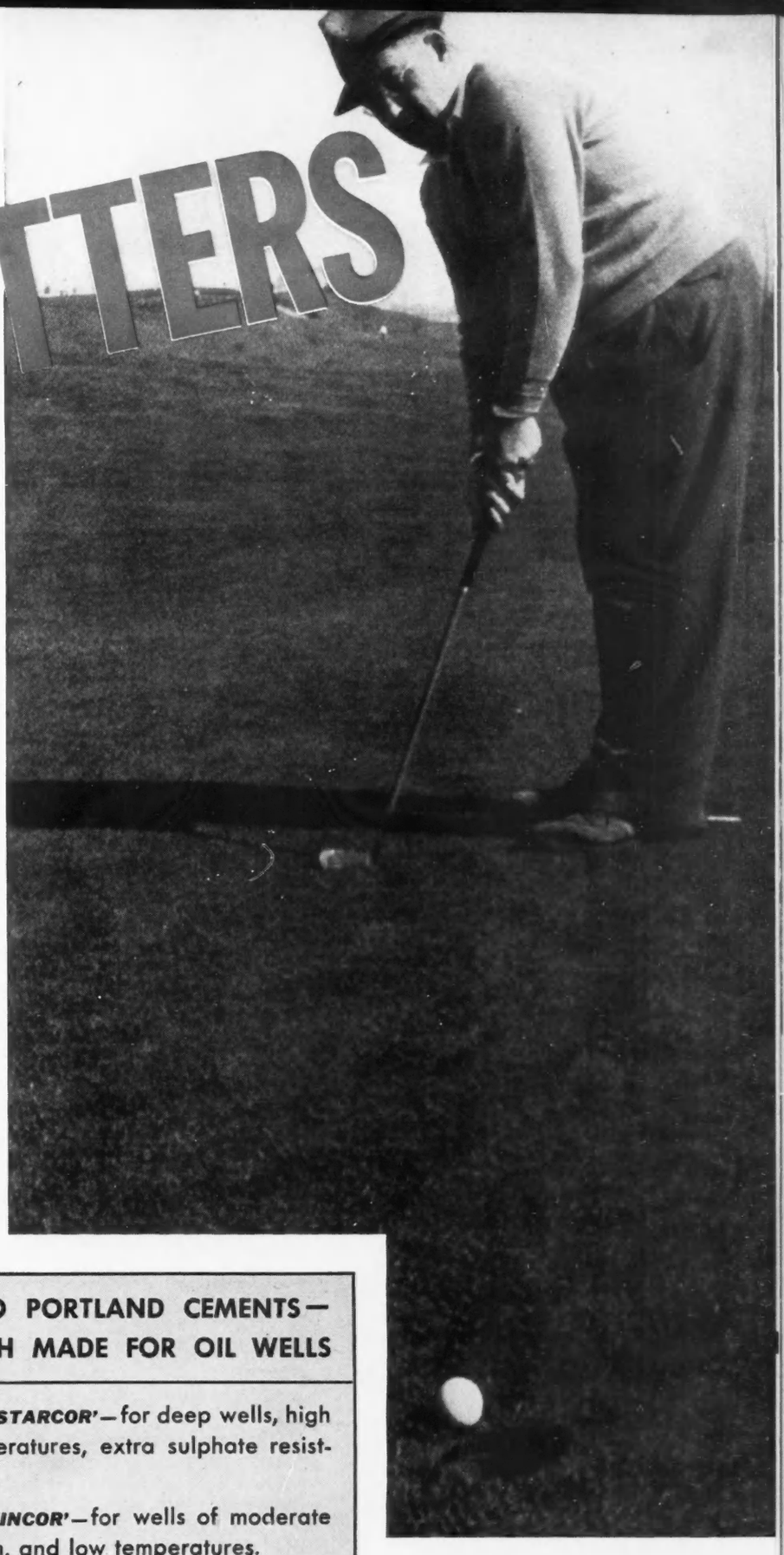
Mud pumps used on one outfit are the 7¼ x 14 power type, for operation with 3½-inch, internal flush drill pipe. One operator uses two 200-horsepower Diesel engines for prime movers, while a second Gulf Coast producer prefers two 240-horsepower engines of the same type. A 96-foot derrick has been successfully used, but a taller derrick might be used to advantage. Adaptation of the small-hole drilling plan to oil field development would require derricks tall enough to give full speed in "in-and-out" operations. The 96-foot derricks now in use give good service in straight exploratory work.

While small-hole drilling along the Gulf Coast has been confined largely to deep exploratory tests, the practice has been applied to a more general type of development in other districts. Small holes have been drilled in Hidalgo County, Texas, to produce distillate properties at a low cost. Small holes have been drilled in several West and South Texas fields, both portable machines and light rotary outfits having shared in this type of development. Small holes have been drilled to 8000 feet in one South Texas field for producing a wet gas zone that was known to deplete rapidly. The trend toward smaller holes in marginal fields has been conspicuous for three years. Drilling costs have been reduced through drilling smaller holes and running smaller surface casing.



A simple earthen mud ditch is used to carry returns to the central pit at a Gulf Coast exploratory location. Samples are caught every 30 feet.

ONE-PUTTERS



HIT THE HOLE THE FIRST TIME ON WORKOVER JOBS, TOO

IT costs more to pump water than to pump oil . . . and getting rid of the water is an expensive nuisance, too. That's why a good workover job pays for itself in no time. But be sure to hit the hole the first time . . . by using the right cement . . . 'Starcor'.

'Starcor' gives you a free-flowing slurry . . . low viscosity means easier to pump. And a 'Starcor' slurry stays liquid till the job is done, then gets hard fast. Results: scores of workover jobs successfully completed with 'Starcor' . . . without a cement failure.

Use 'Starcor'* for squeeze jobs, and for deep wells, high temperatures, and extra sulphate resistance . . . 'Incor'* for wells of moderate depth and low temperatures . . . Lone Star for work above-ground. Portland cements, all—each the quality leader in its own field. Backed by Lone Star's quality record for over a quarter century.

*Reg. U. S. Pat. Off.

TWO PORTLAND CEMENTS— BOTH MADE FOR OIL WELLS

USE 'STARCOR'—for deep wells, high temperatures, extra sulphate resistance.

USE 'INCOR'—for wells of moderate depth, and low temperatures.

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MAKERS OF LONE STAR CEMENT • 'INCOR' 24-HOUR CEMENT • 'STARCOR' CEMENT

Safe Blow-Out Prevention Practices

PART 3

Manipulations necessary to maintain a balance in weight and viscosity characteristics throughout the length of a mud-circuit.

By JAMES I. POWELL, Safety Engineer

THE task of conditioning a drill mud and maintaining an approved condition throughout its length, requires a great many manipulations that are sometimes regarded as being irrelevant. By irrelevant, we mean that some particular employee may believe that a drill mud will, to a satisfying measure, take care of itself. While this may be true under some circumstances, it is not, on the other hand, in accord with the experiences a great many mud conditioners have encountered while attempting to maintain a well balanced mud-circuit. There are far too many factors involved in conditioning and maintaining a mud-circuit, for one not to put a great deal of thought into the details of the task.

The very old process of determining which of two or more ways of doing a job is the better is still a very useful process in any line of endeavor. Those employees whose task it has been to maintain a mud-circuit have tried many methods and processes—both right and wrong ones. They have, by close study of the results of certain practices, arrived at a determination as to which one of any number of tried practices produced the best results. These outstanding results were considered on the basis that such practices must lessen the possibility of high pressure gases giving trouble. They, too, were considered from the standpoint of developing practices that would keep the borehole in the best possible condition.

The practice of adding commercial muds should be in accord with methods necessary for equally distributing weight and colloidal elements throughout the entire mud-circuit.

We have already explained in preceding articles *how it is possible for a mud-circuit to get out of balance. In other words, how it is possible for one section of the circuit to weigh more and have a greater viscosity than another section of the same circuit.

A well conditioned mud should be so constituted that the elements comprising its body should be equally distributed throughout the length of the circuit. However conversely to this situation, a light spot in a mud-circuit is often caused through some act of operation; for instance, by diluting the mud with clear water. And, in such cases, the character of the mud is changed in that particular section where the dilution occurred, but not necessarily in the remaining section. It is such a condition as this that prevents the mud from being well conditioned.

Most drill muds are primarily composed of natural elements which were incorporated into the basic drilling fluid from the cuttings removed from the borehole. These natural elements differ in many instances from the elements comprising a commercial mud. This, however, only applies in respect to the locality from which the two different elements originate and it does not interfere with the two combining into a highly satisfactory drill mud. But, the point we wish to bring out is that this difference does have a bearing on the manner in which commercial muds are added to a natural base drill mud.

There is an urge among some few field employees to add commercial muds only to the sections of a mud-circuit that have indicated, by test, to be lighter than the remaining sections. Such a practice might ultimately have to be resorted to, but first, effort should be made to balance the entire mud-circuit before any commercial muds are added. The differing elements should not be disproportioned in a mud-circuit unless proper manipulation of the mud will not produce a natural balance in weight and viscosity characteristics.

An experienced mud conditioner, after seeing that the weight of a mud should be raised, will first manipulate the entire circuit so that the weight and the viscosity will be in balance. Then, by calculating the time that is required for a given point in the mud-circuit

* Part 1, The Oil Weekly, February 13, 1939, and Part 2, The Oil Weekly, February 20, 1939.

Regulate the Counterbalance Effect to Meet the Individual Conditions of Your Well with a

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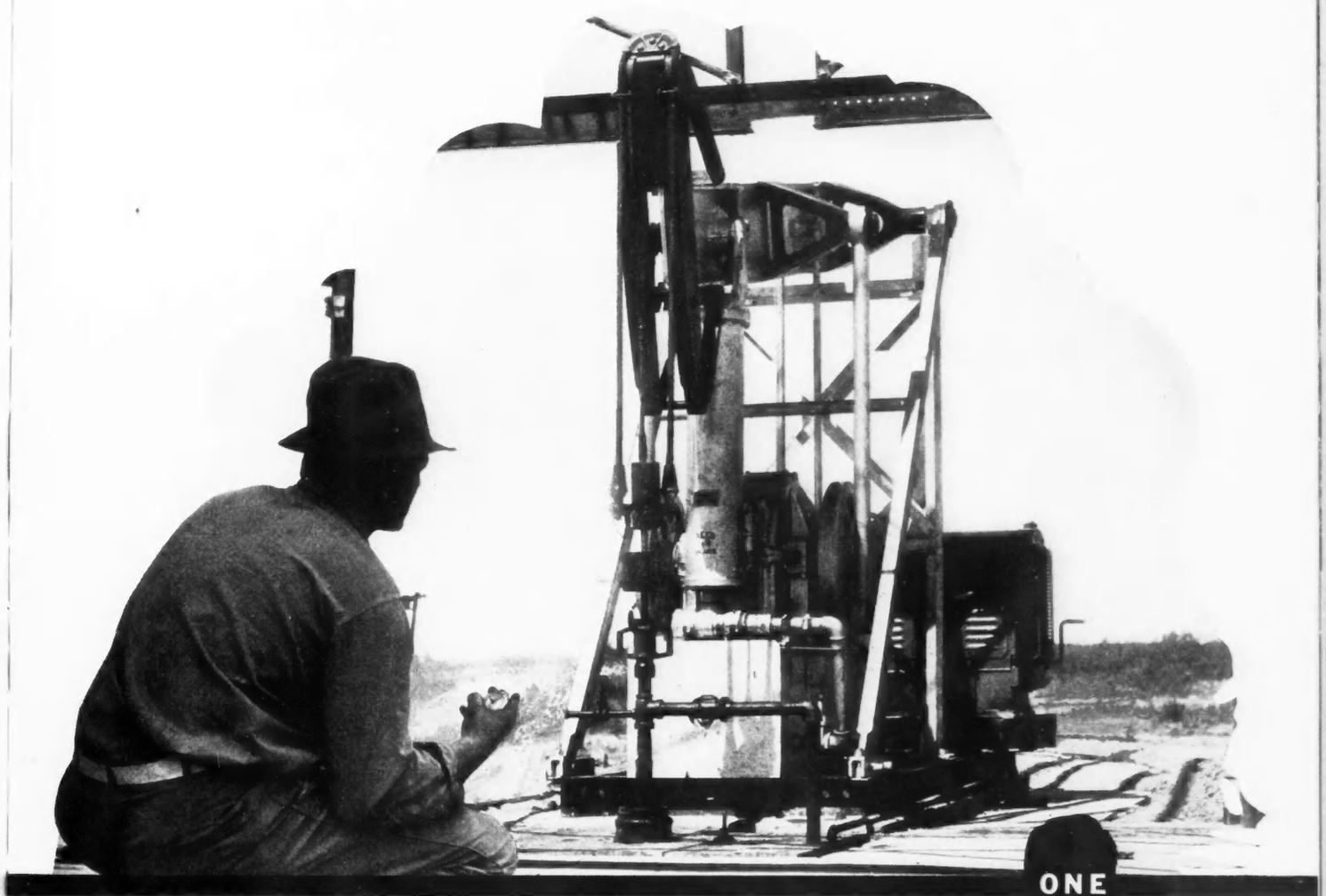

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to complete a cycle of circulation, he will have an estimate of the amount of time that should be given to adding a given amount of commercial mud equally throughout the mud-circuit.

Definite methods in the use of mud-guns result in mud being properly conditioned prior to, and for particular drilling operations.

Employing Mud-Guns During Coring Operations

During the course of cutting cores with the latest coring devices there are certain peculiar situations that exist which must be taken into consideration. That is, from the standpoint of what is required to maintain a well conditioned mud during these operations; in the first place, coring operations usually begin at a depth at which considerable sand formations are encountered. And while coring through sand, the addition of weight element to the upkeep of the mud-circuit is a negligible factor.

Sand is not the only formation cored, however; shale is often encountered, but because there is such a small surface of the corehead that produces cuttings, any weight element which might disintegrate from these cuttings cannot contribute much to the upkeep of the mud-circuit.

The rotating speed of a drill string, while coring, is much slower in proportion than it is while drilling ahead with full size drill bit. Then, too, the weight applied to the corehead is less in proportion than that applied to the drill bit. Thus as a consequence of these two involving factors, the drill string takes on a more rigid character. The result of this form in the drill pipe is that it permits a mud-cake to form on the walls of the borehole that is much thicker than it would be during normal drilling or hole making practices. A good percentage of any weight element that would possibly contribute to the weight upkeep of the mud-circuit will, on the other hand, go toward building up the mud-facing on the walls of the borehole.

Thus, during coring operations, there exists a situation which is an influence for drill mud to lose weight rather than gain. The constant use of mud-guns during these coring periods have produced good results, in that the mud streams are instrumental in combining enough weight element from the pits to compensate for losses otherwise. The addition of commercial muds may also be necessary in order to provide additional precaution while drilling into a high pressure gas sand.

It seems appropriate here to stress the importance of keeping a close watch over the condition of a mud-circuit while coring. It is during these coring operations that, as a rule, most of the high pressure gas formations are encountered. And by reason of the fact that a high pressure gas sand is more apt to give trouble at that particular time than it is after drill mud has permeated the formation, one can see the importance of constant attention being given to the conditioning of the mud-circuit.

Employing Mud-Guns to Condition "Fill-Up Mud"

Fill-up mud is a term that shall be applied to the mud that is pumped into the borehole as a drill string is being withdrawn.

Prior to beginning the operation of "coming out of the hole with drill pipe," a safety-minded driller will see to it that the drill mud is in the proper condition. In other

Resume

Manipulations necessary to maintain a balance in weight and viscosity characteristics throughout the length of a mud-circuit:

The practice of adding commercial muds should be in accord with methods necessary for equally distributing weight and colloidal elements throughout the entire mud-circuit.

The elements comprising a drill mud vary, due to the fact that different types of formations contribute a specific element which governs the condition of that section of the mud-circuit employed while drilling through that portion of that particular formation. Certain practices, some of which have already been discussed, govern the condition of certain sections of a mud-circuit. From a logical standpoint, a drill mud will serve its purpose best if the various elements comprising its weight and viscosity characteristics are equally distributed throughout the length of the circuit. Hence, there are certain practical manipulations to be considered when commercial muds are to be added.

* * *

Definite methods in the use of mud guns result in mud being properly conditioned prior to, and for particular, drilling operations:

Employing mud guns during coring operations—slow rotating speed permits a thicker mud cake to form on bore hole walls, which results in much of the weight element being imbedded in the mud cake—the mud tends to become lighter during coring operations—the greater percentage of formations drilled is sand; thus, a natural weight element is not contributed to the normal weight upkeep of the mud-circuit—correct use of mud guns and addition of commercial mud when necessary will overcome this problem.

Employing mud guns to condition "fill-up" mud—"fill-up" mud is the mud pumped into the hole to compensate for displacement as the drill pipe is withdrawn from the bore hole—because of the stationary condition of the mud in the pits, a well conditioned mud will not flow naturally to the suction end—a stream of clear water is directed onto the drill pipe to wash off the mud. This inter-mixes with the mud and guns are em-

words, when a drill string is withdrawn it is essential that the drill mud column possess proper weight and viscosity and that the pressure exerted therefrom will counteract the pressure exerted by a high pressure gas. Hence, the condition of the mud left in the borehole when circulation is stopped should be of an approved character. Also, any mud pumped into the borehole to compensate for the space occupied by the drill pipe should, too, be of an approved character.

In ordinary drilling practices, when pulling a string of drill pipe, a great deal of clear water is used to wash the mud from the outside of drill pipe. Some of the water falls into the borehole while some of it goes into the mud ditch with the surplus fill-up mud. The fact that both the water and the conditioned mud flows down the ditch and through the pits together causes the two to combine which results in the presence of a very thin and light mud. This very thin mud will flow unrestrained right across the top of the heavier muds in the pits and will, if not properly manipulated, flow directly to the suction end of the circulating pump. If and when the circulating pump takes this thin mud into the suction, it will naturally be employed as a fill-up mud.

Because of this hazard, in that such an occurrence lessens the ability of the mud to exert the proper pressure on top of the gas formation, it is found that the mud-guns serve a useful purpose in conditioning this light mud before it reaches the suction end.

The settling pit at most drilling rig locations is divided in the middle by a baffle, or shale board as it is more commonly called. The purpose of this board is to arrest the passage of any sand or shale particles that might be contained in the mud flow. These unwanted particles of sand and shale remain in and settle to the bottom of the first settling pit. Hence, to use a mud-gun on the first section of settling pit would mean that some sand and shale would be combined with the mud-flow.

However, to condition the very thin mud or the surplus fill-up mud as it passes through the pits, the mud-gun in the second section of the pit should be used. By directing the mud stream of the gun at an angle so that it will stir up the heavier muds in the bottom of pit, the heavier mud element will then boil up and combine with the thin mud as it passes that particular point of manipulation. Such a practice will result in producing a well conditioned mud for use in fill-up practices. If this particular drill mud is, after conditioning, in excess of the approved and normal weight required —so much the better—because it must be remembered that a small amount of water will be added as it enters the borehole. The water referred to will, of course, be the wash water used on the drill pipe.

Employing Mud-Guns and Water Stream to Release Impounded Gas from Mud-Circuit

Certain factors are an influence to a drill mud becoming laden with gas. It is sufficient to say here, however, that such an action does take place due to various sets of circumstances that are beyond the control of the mud conditioner.

When such a gas-laden mud flows from the flow line, it has certain visual characteristics that are immediately detectable to an experienced mud conditioner. A gas-laden mud is fluffy and creamy in character and as it passes down the mud ditch and through the pits many gas bubbles will appear on the surface.

It can be noticed that when a gas-

ployed to combine the heavier muds in the pit with this lighter mud before it reaches the suction end.

Treating gas laden mud with mud gun stream and water, an aid in releasing impounded gas—determine how, through practical means, mud is found to possess impounded gas—mud hydrometer furnishes some evidence—gas bubbles in mud, etc. The best process to employ in adding water to the mud-circuit —small high pressure spray directed into the mud ahead of the shale shaker—the effect water has on reducing the viscosity and building up the weight in a drill mud—weight of a mud determined by volume, the more gas laden a mud is, the more volume it has which at the same time reduces its weight.

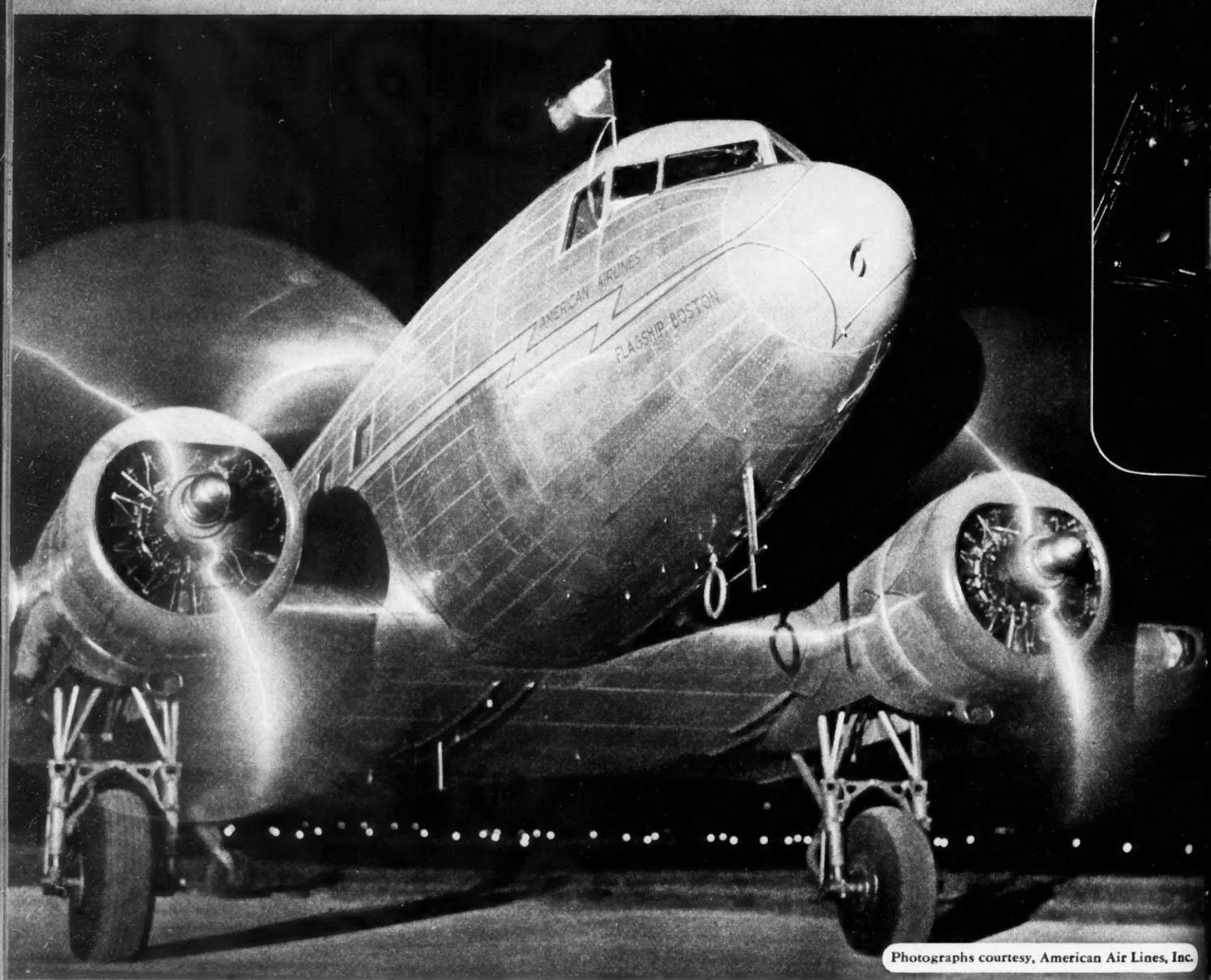
Conditioning drill mud with mud guns before commencing circulation—when a small diameter coring drill collar has been withdrawn from the bore hole and a larger diameter drill collar with full size bit attached rerun, the resultant condition within the bore hole is a matter to be considered in its relation to both operations and condition of mud—the excessive walling of hole during coring operations—sheared off by large drill collar—circulation must be commenced before reaching bottom of hole—possibility of losing returns—conditioning mud in view of having to raise the conglomerate of drill mud, shale and mud cake out of hole and yet avoiding loss of mud into a sand.

* * *

Manipulating the "course" and "spread" of the "mud flow" through the pits—an aid toward maintaining a uniform mud-circuit:

There are certain types of formations that contain the necessary elements to make a drill mud both heavier and more viscous. And, along with such conditions, the mud is at the same time being laden with gas. The two factors to be concerned with in conditioning a mud of this type as it comes from the flow line are: to add the correct proportions of water and manipulate the mud in such a manner that the impounded gas will be released. Since the mud guns cannot be used on a mud which is already in excess of proper weight and viscosity, we have to resort to the aeration principle. By this we mean, the proper manipulation of the course and spread of the mud flow through the mud pits which will tend to aerate the mud and it will in turn release impounded gas.

EXPERIENCE



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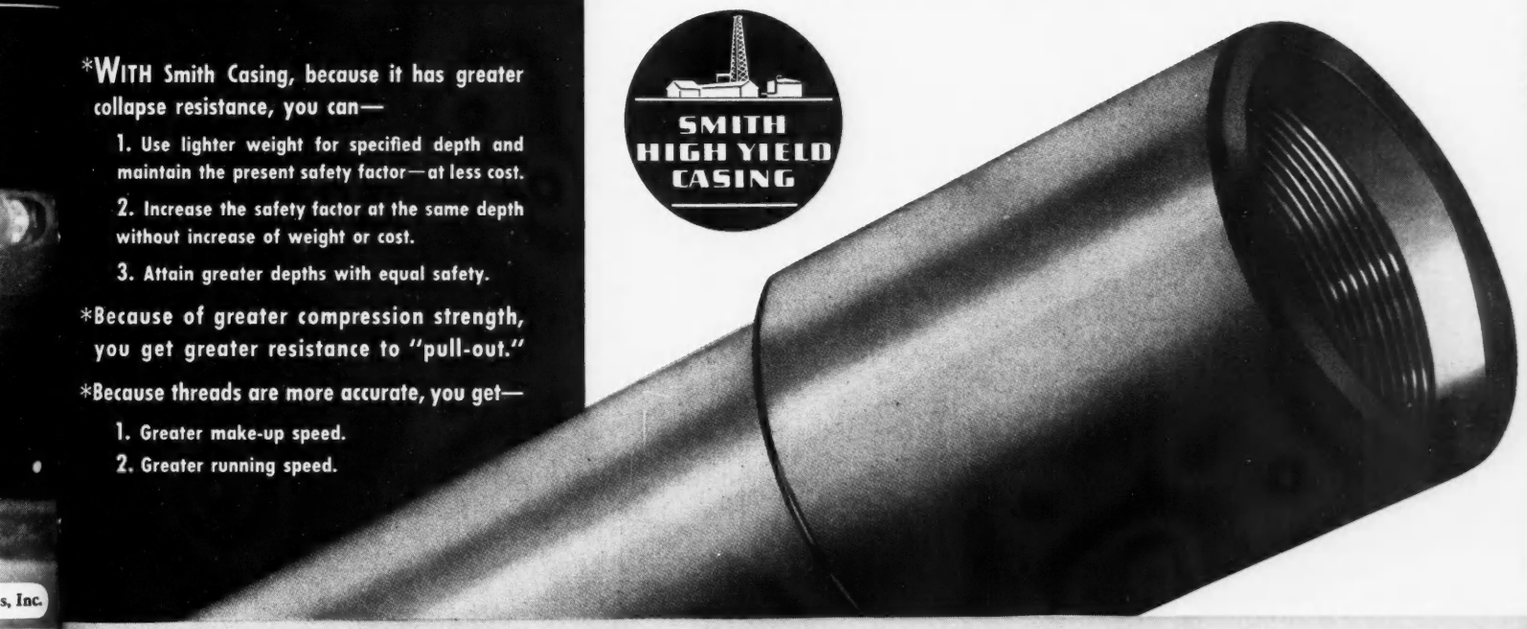

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laden mud is weighed in a mud hydrometer and left there for a few minutes, the weight of that particular portion will increase several points on the hydrometer scale. This action has been more noticeable when the hydrometer has been placed where natural vibration from the drilling equipment will accelerate a settling action in the mud contained in the bakelite cup. As the mud in this cup settles or becomes more compact, the impounded gas will raise to the top and thus escape through the overflow outlet in the top of bakelite cup. This space is then filled with the water which enters through the same outlet from the hydrometer case. The result is that the weight of this particular tested mud will be increased, due to the fact that water replaced the volume occupied by the gas. This type of practical test can give some evidence as to how much, or to what extent, a mud is laden with gas.

It cannot be considered good safety practice to permit an already gas-laden drill mud to re-enter the borehole where conditions may be such that the mud will become laden with gas to even a greater extent. Thus, it becomes necessary to manipulate that mud in a way that will result in the impounded gas being released. A very good method to employ in accomplishing this is to install a water spray which will be directed into and against the directional flow of the mud. The location of this spray should be just ahead of the shale shaker. This water spray nozzle should be very fine; that is from the standpoint of the hole or slot through which the water is emitted producing a fine fan-like spray. But on the other hand, the water should be very forceful; that is, with enough force to boil up the mud as it passes down the mud ditch. The point is that a very strong spray of water is necessary, but a large volume of water is not wanted. This high pressure water spray cuts the vicious element which holds the gas impounded, and as the mud passes onto and over the shale shaker, the vibrating sieve action on the mud body assists in releasing a great deal of the gas. To further this process—as the mud flow passes the mud-gun station, a stream of mud is directed into and with the directional flow of the mud and deep enough to reach the heavier mud in the bottom of the pit. As a result of this process, weight element is added to compensate for any thinning the water might have caused, and, too, the boiling action caused by the mud stream tends to release the greater portion of the remaining impounded gas.

Conditioning a Drill Mud with Mud-Guns Before Circulation is Commenced

In drilling operations, one must always be concerned with the various steps of operation that have preceded an operation that is still to be performed. In other words, it is how the preceding operation was carried out and the consequences which might have possibly resulted from it that determines the course that should be followed in the next operation.

We have already indicated how a thick mud-cake is formed on the facing of the borehole during the course of cutting cores. Thus, when the coring drill collar is withdrawn from the borehole, it shears away some of this mud-cake, but only that amount which is in proportion to the diameter of the collar. The next step in drilling operations that usually follows the pulling of the coring drill collar is to run a large size drill collar with full gauge bit attached into the borehole. Since the large drill collar has a larger diametrical volume than the coring drill collar, the larger drill collar will shear away a great deal more of mud-facing from the borehole wall as it is run into the hole.

Due to these circumstances, the mud-facing, which is composed of heavy sand and shale particles, will fall into the borehole ahead of the bit and drill collar and be pushed on downward to greater depths. That is, this conglomerate-mud will be pushed on downward until it fills up the lower portion of the borehole. And then, the drill collar and drill string will, by the force of their weight, pass right on through the semi-solid mass of mud, shale and sand. Moreover, in doing so the mud-eyes in the drill bit are being driven, so to speak, directly into a conglomerate mass that will circulate as a fluid only under certain conditions.

Under these conditions, when mud circulation is started, the mud that is discharged from the eyes in the drill bit must raise this conglomerate-mud to the surface. And, at this point we become interested in the type and condition of the drill mud that will be pumped into the drill string for the purpose of raising this conglomerate.

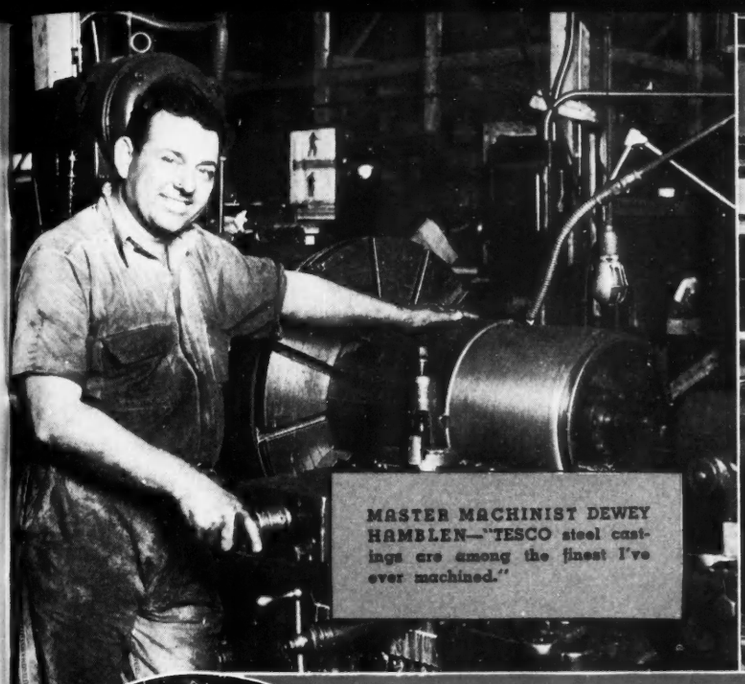
There have been instances in which the contents of all the mud pits have been emptied and forced back into a sand formation, due to this mass of conglomerate-mud obstructing its usual passage back to the surface. However, in these particular instances, the drill mud that was pumped into the drill string was, by far, much thinner than the conglomerate which it was expected to elevate. In other words, due to the tendency on the part of a drill mud to take the course of least resistance, the thin mud permeated the sand formation since it was unable to overcome the resistance and weight of the conglomerate that was in its path.

An experienced and safety-minded driller, in running a string of drill pipe into the hole under such circumstances, will stop the bottom of drill pipe some thousand feet off the bottom of hole and start mud circulation at that point. This is done with the objective in mind of removing this conglomerate from the borehole in portions rather than attempting to remove it all at once. In employing this stage process, after the heavy mud has been removed from the hole by the circulating mud, another five hundred feet of drill stem can be added to the drill string and the same process repeated until bottom is reached.

The function which the mud-guns are called upon to perform in this process is to develop as heavy a mud as is possible from the weight elements which have settled to the bottom of the mud pits. This heavy mud is then employed in each stage of the mud circulation as the drill string is being lowered to the bottom. It is an established fact gained from experience that a heavy mud pumped into the borehole will raise another heavy mud from the borehole rather than permeate a porous sand formation.

"Swabbing Action"—and Factors That Determine Whether or Not Equipment on Bottom of Drill String Is Causing It.

"Swabbing action" is the term commonly applied to the action created when, for instance, an adhesive shale mass forms about the stock of the drill bit, and in doing so completely fills the diametral space of the borehole so that when the drill string is raised, the drill mud above the bit will correspond in movement to that of the drill string. Moreover, in ordinary drilling operations, the only means for determining to what extent this action is taking place is to observe either the state of drill mud inside the surface casing



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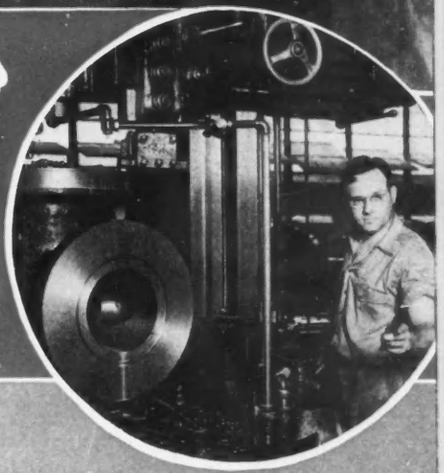

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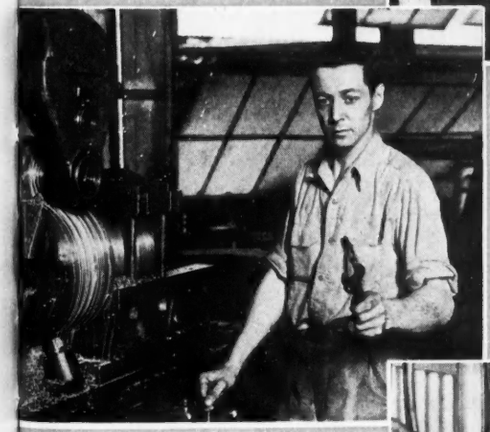

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or observe the manner in which the drill mud is emitted from the flowline.

Even a minor occurrence of swabbing action during any of several particular drilling operations is sufficient evidence to prompt measures that will overcome such action before that particular operation is carried to completion. In other words, it is not a good safety practice, after a well has commenced to swab; for example, during a pipe pulling operation, to go ahead with the operation without first removing the cause for the swabbing action.

The status of a well, or rather whether or not the borehole has been drilled to sufficient depth to be concerned with high pressure gases, water-bearing formations, etc., determines what consequences might be expected as a result of swabbing action. It is with drilling operations where the borehole has been drilled into or below a high pressure gas formation that, from a blowout prevention standpoint, drilling crews should be extremely cautious in preventing swabbing action in even a moderate form.

Instrumental Factors Involved in the "Balling-Up" of a Drill Bit and Means for Overcoming a Resultant Swabbing Action.

The natural properties of some shale formations are such that they contribute materially to a tendency on the part of the drill bit to "ball-up" while making hole through such formations. Then, too, there are other involving factors to be considered. For example, the amount of weight applied on the cutting surface of the bit while drilling in shales having a high content of glutenous material has an influence toward causing a bit to ball-up or else forestalling such action. The reason for this is that the larger shale cuttings which result from excessively applied weight to the bit—rather than be carried normally out of the borehole by the mud flow—have a tendency to adhere to anything in the borehole where conditions will permit.

Circumstances that are an influence to glutenous shale cuttings adhering to a drill bit are in some measure due to the fact that near the bottom of drill string the external walls of drill collar and stock of drill bit are not being constantly slapped against the walls of the borehole. However, in contrast with a section near the middle of the drill string, it is reasonable to conclude that the "revolving-slapping" action of the drill pipe against the walls of the borehole will shear away any glutenous material that might attach itself to the drill pipe. Moreover, by reason of the diametrical difference between the gauge of the drill bit and the size of the drill collar or stock of bit, it must be concluded that at a point so near the bottom extremity of the drill string, the same action that would shear away the shale does not exist. Thus, the only action in that particular section which tends to prevent shale from adhering to the stock of bit is the action created by the force of the circulating drill mud.

From the standpoint of the driller being able to determine to what extent a bit is balling-up is a matter that resolves itself into a practical problem that must be solved primarily through a well-seasoned sense of practical judgment. There are a number of practical ways through which a driller may arrive at a conclusion as to whether or not a bit is balling up; but these ways must be based on a close study of the changes that occur during the course of making hole.

At the majority of drilling rig set-ups, they do not have scientifically designed devices that will measure and indicate a decrease in the volume of mud that is being emitted through the flowline. Such an indicative device would, to some degree, furnish evidence that a bit was balling-up. That is, as a ball forms about the bit, the normal volume of circulating drill mud will be lessened in proportion to the extent in which the bit is balled up.

The driller, on the other hand, must rely on his own ability to detect this possible "choking down of the mud flow" by the manner in which the pump operates. Whether a pump be gasoline or steam-driven, the regularity or irregularity of the pitch and tone of its exhaust will indicate whether the pump is operating under normal circulating conditions or against an increase in pressure. An increased load on the pump during actual hole-making operations is either an evidence of a balled-up bit or else is indicative to the possibility that a conglomerate of side wall facing, shale, etc., has partially obstructed the normal passage of drill mud through the annular space outside the drill pipe.

It is important that before coming out of the hole with a string of pipe, the bit should be free of any shale ball that might have previously formed on it. If the driller has reason to believe the bit to be slightly balled-up, he will manipulate the drill string in such a way that a side-wall shearing action will assist in removing the ball. This is accomplished by raising the drill string so that the bit will not have a bottom support; hence, its state of "dangling flexibility" will result in a slapping action taking place against the walls of the borehole while it is being rotated.

A spudding action should also accompany the manipulation referred to above. By spudding action, we mean that the drill string is raised as rapidly as possible off bottom for about thirty feet and then the direction is reversed. During the lowering act, the drill string should be rotated fairly fast and dropped at as rapid a pace as good safety judgment will indicate. Just prior to the drill bit reaching bottom, the rotary clutch should be released and the torque and weight of the drill string should be allowed to impact slightly with the bottom of the borehole. The resultant effect of this manipulation will assist in removing the ball from the bit.

It seems that a word of warning might well fit into the line of thought at this point. The written word falls short in its ability to give emphasis, in so short a space, to all the hazards that exist, should these referred-to manipulations not be carried out on a basis of a sound practical judgment. It is in carrying out these acts that one should not be the least influenced to be careless or neglectful of detail, but rather he should exercise the utmost precaution in all related matters concerned.

When a drill string is ready to be started out of the hole, particularly in the event high pressure gases have been encountered, a crew member should be stationed at a point where he can keep close watch over the action of the drill mud as it is discharged from the end of the flowline. Any irregular action on the part of the mud-flow indicates a possible swabbing action or gas eruption, and such should be immediately reported to the driller. The driller can then adjust the speed of hoisting or perform manipulations that will remove the cause for the swabbing action.

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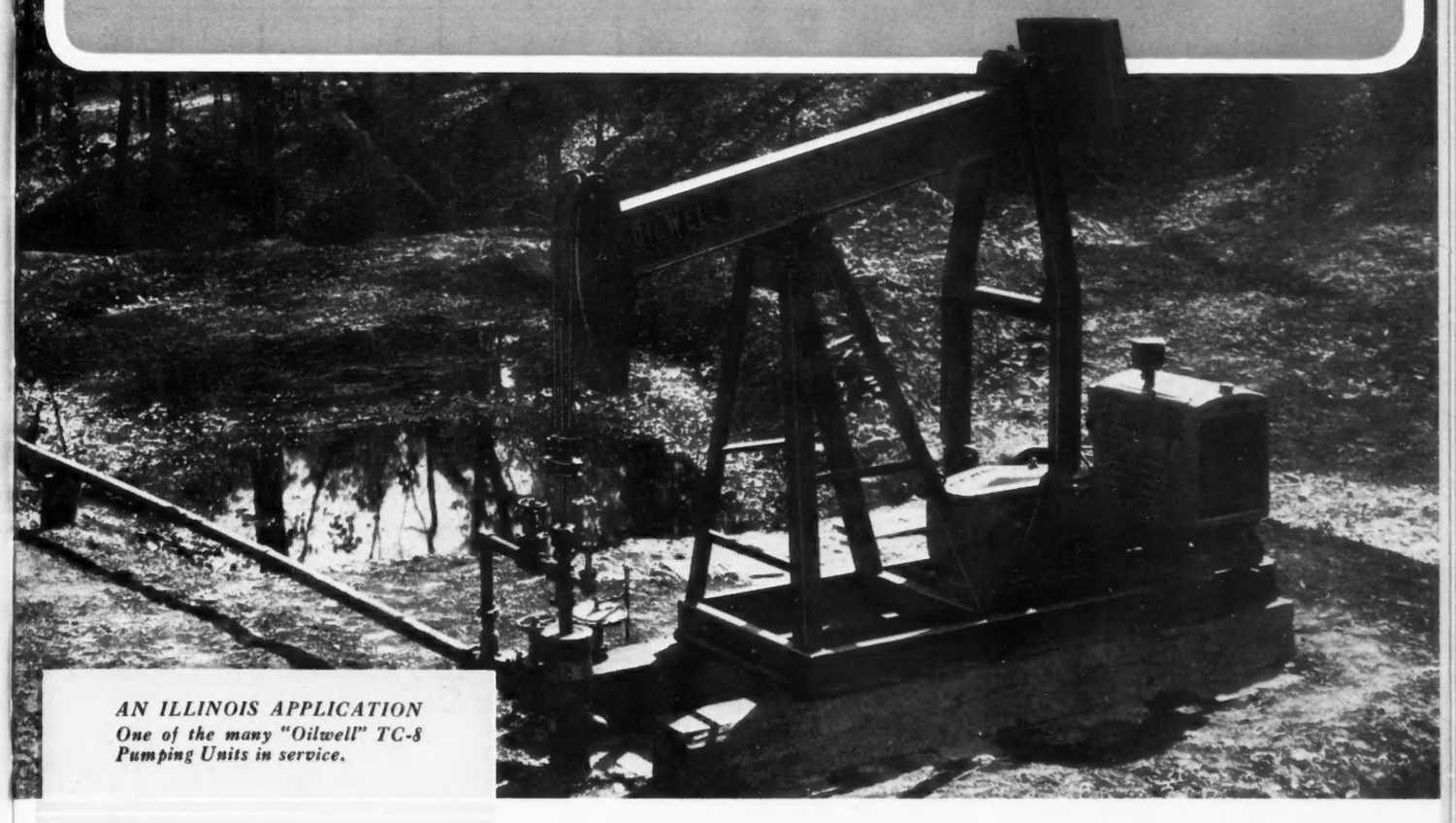

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Some Current Problems

[*Continued from page 18*]

efficiency, localized market demand should not be the sole criterion by which to restrict local production.

4. Each state and each area or field within each state should produce in such a manner as to coordinate the requirements of market demand and physical efficiency. This would be furthered by accepting the principle that each state participate in supplying the total market requirements largely on the basis of reserves, with appropriate prior recognition to stripper production.

5. Remove the incentive for unnecessary and unprofitable drilling. Subject to the requirements of minimum physical waste, this calls for the acceptance as an incident of proration of the general principle that each operator seek to produce only the recoverable oil from his land.

I believe that adherence to the policies above outlined will go a long way toward removing the difficulties in which the industry now finds itself. The principles and policies enumerated by me are not fundamentally new. They are recognized and accepted by many who deal with the problem. They were new ten or twelve years ago. Their recognition today marks the progress made. While the problems and difficulties become complex with the addition of new units, new areas, and new states into the production picture, the problem is not so great as it was ten years ago when the governing principles were unknown. The road to progress is not yet clear and wide, but the trail has been blazed. For the most part, the operators in all branches of the industry and the conservation authorities are trying to meet the issues in the right way.

TABLE 6

Crude Oil Production and Reserve Data on Illinois

Showing, by New and Old Field Groups: Number of Producing Oil Wells, Total Production, Production per Well per Day, Known Crude Oil Reserve in Barrels and in Terms of Years Supply, the Latter Showing Particularly the Rapidity with Which Reserves in New Fields Are Being Depleted

New Fields

YEAR	Producing Oil Wells, Jan. 1	PRODUCTION		Production per Well, B/D	KNOWN RESERVES, JAN. 1		
		B/D	Percent of U. S.		Million Barrels	Percent of U. S.	Year's Supply
1937	0	9,000	0.3	69.2	0	0.0	0.0
1938	260	52,000	1.6	42.0	17	0.1	5.2*
1939	2,214	.....	....	....	281	1.6	14.8*
Current (Jan. 1, 1939)	2,214	126,000	3.9	56.9	281	1.6	6.1

Old Fields

1937	14,100	12,000	0.3	0.8	28	0.2	....
1938	13,850	12,000	0.4	0.9	24	0.2	5.5*
1939	13,600	.....	....	....	19	0.1	4.3*
Current (Jan. 1, 1939)	13,600	11,000	0.4	0.8	19	0.1	4.7

* Based upon average production rate during preceding year.
Source: See Table 5.

TABLE 7

U. S. B. M. Estimates of Demand—Participation in Production—Reserves by States in the United States

Showing particularly by States for December, 1938, comparison between actual participation in the total U. S. production and calculated participations assuming that the distribution be based upon prior recognition of stripper production with the remainder participated in according to various combinations of relative localized market demand and relative flush crude oil reserve.

STATE	DECEMBER, 1938						*ESTIMATED RESERVE, BILLION BARRELS, JAN. 1, 1939			
	U. S. B. M. ESTIMATED DEMAND		ACTUAL PRODUCTION, B/D							
	B/D	Percent of U. S.	Flush	Stripper	Total	Percent of U. S.	Flush	Stripper	Total	Percent of U. S.
Texas	1,343,900	40.7	1,150,000	150,000	1,300,000	39.7	8.950	0.550	9.500	54.2
New Mexico	100,300	3.0	88,000	10,000	98,000	3.0	0.617	0.033	0.650	3.7
Louisiana	248,000	7.5	233,000	26,000	259,000	7.9	0.898	0.052	0.950	5.4
Oklahoma	500,700	15.2	73,000	355,000	428,000	13.1	0.570	0.530	1.100	6.3
Kansas	159,000	4.8	98,000	54,000	152,000	4.6	0.571	0.124	0.695	4.0
Arkansas	51,600	1.6	22,000	28,000	50,000	1.5	0.133	0.052	0.185	1.1
Illinois	71,900	2.2	100,000	25,000	125,000	3.8	0.250	0.050	0.300	1.7
Michigan	51,000	1.5	23,000	28,000	51,000	1.6	0.022	0.028	0.050	0.3
Balance Eastern States	97,100	2.9	.....	92,000	92,000	2.8	.....	0.420	0.420	2.4
Balance Rocky Mountain	92,600	2.8	.....	69,000	69,000	2.1	.....	0.405	0.405	2.3
California	589,700	17.8	453,000	198,000	651,000	19.9	2.755	0.495	3.250	18.6
Total United States	3,305,800	100.0	2,240,000	1,035,000	3,275,000	100.0	14.766	2.739	17.505	100.0

* Personal estimate.

Participation by States in U. S. Crude Oil Production

Calculated with prior credit for stripper production plus various considerations of market demand and flush reserves as indicated

STATE	Actual for December, 1938			Stripper + (75% M + 25% R)			Stripper + (50% M + 50% R)			Stripper + 100% R		
	B/D	Percent of U. S.	Reserve: Year's Supply	B/D	Percent of U. S.	Reserve: Year's Supply	B/D	Percent of U. S.	Reserve: Year's Supply	B/D	Percent of U. S.	Reserve: Year's Supply
Texas	1,300,000	39.7	20.0	1,379,000	41.8	18.9	1,420,000	43.2	18.3	1,505,000	45.7	17.3
New Mexico	98,000	3.0	18.2	100,000	3.1	17.8	102,000	3.1	17.5	104,000	3.2	17.1
Louisiana	259,000	7.9	10.0	226,000	6.8	11.5	205,000	6.1	12.7	163,000	4.5	16.0
Oklahoma	428,000	13.1	7.0	486,000	14.8	6.2	472,000	14.5	6.4	442,000	13.8	6.8
Kansas	152,000	4.6	12.5	155,000	4.6	12.3	151,000	4.4	12.6	141,000	4.0	13.5
Arkansas	50,000	1.5	10.1	50,000	1.6	10.1	49,000	1.5	10.3	48,000	1.5	10.5
Illinois	125,000	3.8	6.6	70,000	2.1	11.7	67,000	2.0	12.3	63,000	1.9	13.1
Michigan	51,000	1.6	8.4	46,000	1.4	9.4	41,000	1.3	10.5	31,000	1.1	13.9
Balance Eastern States	92,000	2.8	12.5	96,000	2.9	12.0	95,000	2.9	12.1	92,000	2.8	12.5
Balance Rocky Mountain	69,000	2.1	16.1	72,000	2.6	15.4	71,000	2.4	15.6	69,000	2.1	16.1
California	651,000	19.9	13.7	595,000	18.3	15.0	602,000	18.6	14.8	617,000	19.4	14.4
Total United States	3,275,000	100.0	14.7	3,275,000	100.0	14.7	3,275,000	100.0	14.7	3,275,000	100.0	14.7

TABLE 5

Crude Oil Production and Reserve Data for the United States by States

Showing the Trends by States of: Number of Producing Oil Wells, Bureau of Mines Estimate of Demand, Actual Production, Production per Well per Day, Known Crude Oil Reserves in Barrels and in Terms of Years Supply, and Showing Particularly Comparison Between Each State's Percent of U. S. Production and Its Percent of U. S. Crude Oil Reserves

TEXAS

YEAR	Producing Oil Wells, Jan. 1[1]	Bureau of Mines Estimate Demand B/D	ACTUAL PRODUCTION[1] B/D	ACTUAL PRODUCTION[1] Percent U. S.	Production per Well, B/D†	KNOWN RESERVE: JAN. 1 Million Bbls.	KNOWN RESERVE: JAN. 1 Percent U. S.	KNOWN RESERVE: JAN. 1 Years' Supply‡
1929	35,750	.....	814,000	29.5	22.6	.....	.....	.....
1930	36,280	.....	795,000	32.3	21.4	.....	.....	.....
1931	38,060	.....	910,000	39.0	24.0	.....	.....	.....
1932	37,650	.....	853,000	39.8	21.0	.....	.....	.....
1933	43,630	.....	1,103,000	44.5	24.0	.....	.....	.....
1934	48,100	967,700	1,045,000	42.0	20.8	5,884[2]	44.0	14.6
1935	52,300	1,034,800	1,075,000	39.4	19.3	5,500[3]	45.2	14.4
1936	59,110	1,113,100	1,169,000	38.9	18.5	.....	.....	.....
1937	66,920	1,338,000	1,399,000	39.8	19.4	6,422[3]	49.2	15.0
1938	77,360	1,354,500	1,302,000*	39.2	16.0	8,245[3]	53.2	16.1
1939 (Est.)	85,563	.....	.....	.....	.....	9,500[4]	54.2	20.0

LOUISIANA

YEAR	Producing Oil Wells, Jan. 1[1]	Bureau of Mines Estimate Demand B/D	ACTUAL PRODUCTION[1] B/D	ACTUAL PRODUCTION[1] Percent U. S.	Production per Well, B/D†	KNOWN RESERVE: JAN. 1 Million Bbls.	KNOWN RESERVE: JAN. 1 Percent U. S.	KNOWN RESERVE: JAN. 1 Years' Supply‡
1929	3,820	.....	56,000	2.0	14.7	.....	.....	.....
1930	3,780	.....	64,000	2.6	16.6	.....	.....	.....
1930	3,930	.....	60,000	2.6	16.9	.....	.....	.....
1932	3,190	.....	60,000	2.8	19.2	.....	.....	.....
1933	3,050	.....	69,000	2.8	22.1	.....	.....	.....
1934	3,200	81,500	90,000	3.6	28.4	136[2]	1.0	5.4
1935	3,140	120,300	138,000	5.1	42.2	375[3]	3.1	11.4
1936	3,400	173,900	220,000	7.3	61.1	.....	.....	.....
1937	3,800	243,900	249,000	7.1	62.6	524[3]	4.0	6.5
1938	4,160	247,900	262,000*	7.9	57.6	713[3]	4.6	7.8
1939 (Est.)	4,998	.....	.....	.....	.....	950[4]	5.4	9.9

OKLAHOMA

1929	62,900	.....	700,000	25.4	11.3	.....	.....	.....
1930	61,180	.....	593,000	24.1	9.5	.....	.....	.....
1931	63,600	.....	495,000	21.2	8.2	.....	.....	.....
1932	56,720	.....	418,000	19.5	7.3	.....	.....	.....
1933	57,100	.....	499,000	20.1	8.7	.....	.....	.....
1934	56,850	469,400	493,000	19.8	8.7	844[2]	6.3	4.6
1935	56,650	499,200	508,000	18.6	9.1	1,200[3]	9.8	6.7
1936	54,600	540,000	564,000	18.8	10.3	.....	.....	.....
1937	54,800	609,700	627,000	17.9	11.3	1,141[3]	8.7	5.5
1938	55,900	528,700	476,000*	14.3	8.6	1,212[3]	7.8	5.3
1939 (Est.)	54,632	.....	.....	.....	.....	1,100[4]	6.3	6.3

ARKANSAS

1929	4,520	.....	68,000	2.5	16.1	.....	.....	.....
1930	3,900	.....	54,000	2.2	13.9	.....	.....	.....
1931	3,850	.....	41,000	1.7	11.5	.....	.....	.....
1932	3,280	.....	33,000	1.5	10.7	.....	.....	.....
1933	2,880	.....	32,000	1.3	11.1	.....	.....	.....
1934	2,890	31,500	31,000	1.2	10.9	29[2]	0.2	2.5
1935	2,800	30,300	30,000	1.1	10.9	75[3]	0.6	6.6
1936	2,680	30,100	29,000	1.0	10.8	.....	.....	.....
1937	2,670	29,900	32,000	0.9	12.0	84[3]	0.6	7.9
1938	2,670	46,600	50,000*	1.5	17.9	192[3]	1.2	16.4
1939 (Est.)	2,923	.....	.....	.....	.....	185[4]	1.1	10.1

ILLINOIS

1929	16,340	.....	17,000	0.6	1.1	.....	.....	.....
1930	16,000	.....	16,000	0.6	1.0	.....	.....	.....
1931	15,800	.....	14,000	0.6	0.9	.....	.....	.....
1932	15,540	.....	13,000	0.6	0.8	.....	.....	.....
1933	15,170	.....	12,000	0.5	0.8	.....	.....	.....
1934	14,930	12,900	12,000	0.5	0.8	34[2]	0.3	7.8
1935	14,630	11,000	12,000	0.4	0.8	35[3]	0.3	8.0
1936	14,330	11,800	12,000	0.4	0.8	.....	.....	.....
1937	14,100	15,000	21,000	0.6	1.5	28[3]	0.2	6.4
1938	14,110	44,400	64,000*	1.9¶	4.3¶	41[3]	0.3	5.4
1939 (Est.)	15,814	.....	.....	.....	.....	300[4]	1.7	12.8¶

BALANCE EASTERN STATES

1929	168,470	.....	100,000	3.6	0.6	.....	.....	.....
1930	170,650	.....	99,000	4.0	0.6	.....	.....	.....
1931	169,990	.....	89,000	3.8	0.5	.....	.....	.....
1932	165,350	.....	86,000	4.0	0.5	.....	.....	.....
1933	166,525	.....	79,000	3.2	0.5	.....	.....	.....
1934	164,990	86,100	89,000	3.6	0.5	398[2]	3.0	13.8
1935	166,630	90,800	94,000	3.4	0.6	375[3]	3.1	11.5
1936	167,610	93,700	98,000	2.0	0.6	.....	.....	.....
1937	167,420	104,900	105,000	3.0	0.6	479[3]	3.7	13.4
1938	164,670	99,900	99,000*	3.0	0.6	446[3]	2.9	11.6
1939 (Est.)	162,928	.....	.....	.....	.....	420[4]	2.4	11.6

BALANCE ROCKY MOUNTAIN

1929	4,830	.....	70,000	2.5	14.2	.....	.....	.....
1930	5,040	.....	63,000	2.6	12.3	.....	.....	.....
1931	5,170	.....	53,000	2.3	10.4	.....	.....	.....
1932	5,030	.....	47,000	2.2	9.6	.....	.....	.....
1933	4,810	.....	40,000	1.6	8.1	.....	.....	.....
1934	5,030	43,600	48,000	1.9	9.6	310[2]	2.3	21.2
1935	5,000	49,900	55,000	2.0	10.7	322[3]	2.6	18.4
1936	5,230	54,300	60,000	2.0	11.6	.....	.....	.....
1937	5,100	70,600	73,000	2.1	14.2	346[3]	2.7	15.7
1938	5,150	76,200	70,000*	2.1	13.4	394[3]	2.5	14.8
1939 (Est.)	5,321	.....	.....	.....	.....	405[4]	2.3	15.9

MICHIGAN

1929	400	.....	12,000	0.4	26.7	.....	.....	.....
1930	500	.....	11,000	0.4	19.3	.....	.....	.....
1931	640	.....	10,000	0.4	15.7	.....	.....	.....
1932	630	.....	19,000	0.9	29.8	.....	.....	.....
1933	645	.....	22,000	0.9	29.8	.....	.....	.....
1934	830	30,400	29,000	1.2	32.0	17[2]	0.1	2.1
1935	980	35,800	43,000	1.6	40.2	45[3]	0.4	4.3
1936	1,160	36,100	33,100	1.1	26.2	.....	.....	.....
1937	1,360	38,000	46,000	1.3	29.3	44[3]	0.3	3.6
1938	1,780	53,800	52,000*	1.6	26.8	49[3]	0.3	2.9
1939 (Est.)	2,135	.....	.....	.....	.....	50[4]	0.3	2.6

NEW MEXICO

1929	260	.....	5,000	0.2	18.9	.....	.....	.....
1930	270	.....	28,000	1.1	76.7	.....	.....	.....
1931	460	.....	42,000	1.8	94.4	.....	.....	.....
1932	430	.....	34,000	1.6	73.9	.....	.....	.....
1934	490	.....	39,000	1.6	75.7	.....	.....	.....
1934	540	45,500	46,000	1.8	78.0	92[2]	0.7	6.5
1935	640	51,900	56,000	2.1	75.7	350[3]	2.9	20.8
1936	840	68,450	74,000	2.5	70.8	.....	.....	.....
1937	1,250	96,800	106,000	3.0	66.9	471[3]	3.6	17.4
1938	1,920	107,400	98,000*	3.0	46.6	547[3]	3.5	14.2
1939 (Est.)	2,321	.....	.....	.....	.....	650[4]	3.7	18.2

CALIFORNIA

1929	10,710	.....	801,000	29.0	75.5	.....	.....	.....
1930	10,520	.....	623,000	25.3	62.4	.....	.....	.....
1931	9,450	.....	517,000	22.2	56.3	.....	.....	.....
1932	8,910	.....	487,000	22.7	54.7	.....	.....	.....
1933	8,900	.....	471,000	19.0	48.1	.....	.....	.....
1934	10,990	466,000	478,000	19.2	42.0	5,422[2]	40.6	31.6
1935	11,750	499,700	569,000	20.8	46.4	3,500[3]	28.7	20.0
1936	12,780	541,050	587,000	19.5	46.9	.....	.....	.....
1937	12,230	610,300	653,000	18.6	50.8	2,956[3]	22.6	13.8
1938	13,460	653,200	685,000*	20.6	49.8	3,063[3]	19.8	12.9
1939 (Est.)	14,062	.....	.....	.....	.....	3,250[4]	18.6	13.0

KANSAS

1929	19,800	.....	117,000	4.2	5.9	.....	.....	.....
1930	20,080	.....	114,000	4.6	5.7	.....	.....	.....
1931	20,120	.....	101,000	4.3	5.1	.....	.....	.....
1932	19,120	.....	95,000	4.4	5.1	.....	.....	.....
1933	18,300	.....	115,000	4.6	6.2	.....	.....	.....
1934	18,500	122,800	127,000	5.1	6.9	194[2]	1.5	4.6
1935	18,550	145,800	150,000	5.5	7.9	400[3]	3.3	8.6
1936	19,250	151,600	159,000	5.3	8.1	.....	.....	.....
1937	19,800	187,250	194,000	5.5	9.3	568[3]	4.4	9.8
1938	21,850	170,200	162,000*	4.9	7.5	601[3]	3.9	8.5
1939 (Est.)	21,264	.....	.....	.....	.....	695[4]	4.0	11.8

UNITED STATES

1929	327,800	.....	2,760,000	100.0	8.4	.....	.....	.....
1930	328,200	.....	2,460,000	100.0	7.5	.....	.....	.....
1931	331,070	.....	2,332,000	100.0	7.2	.....	.....	.....
1932	315,850	.....	2,145,000	100.0	6.7	.....	.....	.....
1933	321,500	.....	2,481,000	100.0	7.6	.....	.....	.....
1934	326,850	2,357,400	2,488,000	100.0	7.5	13,366[2]	100.0	14.7
1935	333,070	2,569,500	2,730,000	100.0	8.1	12,177[3]	100.0	13.4
1936	340,990	2,814,100	3,005,000	100.0	8.7	.....	.....	.....
1937	349,450	3,344,400	3,505,000	100.0	9.8	13,063[3]	100.0	11.9
1938	363,030	3,382,800	3,320,000*	100.0	9.0	15,507[3]	100.0	12.1
1939 (Est.)	371,875	.....	.....	.....	.....	17,505[4]	100.0	14.5

* 11 Months actual, December estimated. † Based upon average number of wells during year. ‡ Based upon average production for preceding year. ¶ See Table VI for current status.

SOURCES OF DATA:

[1] United States Bureau of Mines. [2] Report of special subcomittee on Petroleum Investigation to the Committee on Interstate and Foreign Commerce of the 73rd Congress. [3] American Petroleum Institute. [4] Personal Estimate.

WORLD DEVELOPMENT and TECHNOLOGY

Edited by
WM. V. GROSS, Associate Editor

Mexican Situation

Richberg and Hurley slated to open negotiations at a time when outlook is gloomy; Najera insists that return of expropriated properties is impossible

What the outcome of conferences supposed to be taking place in Mexico City now between representatives of the American and British expropriated oil companies and the Mexican government will be remains as extremely problematical as settlement of the expropriation controversy has been since March 18, 1938, but it appears that the representatives walked on the stage when the outlook was still dark.

Richberg and Hurley There

Donald Richberg of Washington, former administrator of the National Industrial Recovery Act who was given power to act for Standard Oil Company of New Jersey interests and others in conferences with government officials in Mexico City which were to be directed toward settlement of the expropriation dilemma, and Patrick J. Hurley, former senator who is acting as legal counsel for Sinclair interests, were due to arrive in Mexico City just on the heels of a firm reiteration by Mexico that the oil properties would not be returned. This presented an especially gloomy prospect, coming as it did right after a statement by United States Ambassador Josephus Daniels to the effect that Mexico had turned down a deal whereby Mexican oil would be traded for German airplanes, a statement generally interpreted as lending a little brightness to hopes for an amicable and mutually satisfactory settlement.

Proposal Reported

Following this, Washington, D.C., was the source of news that a proposal would be discussed in the southern capitol whereby the Mexican government would retain title to the expropriated oil properties but would agree for the companies to operate them on a long term contract.

In connection with such a proposal, it is said the companies' representatives would ask for specific statements from Mexico as to what taxes would be, what labor conditions under such an agreement would be, and for reimbursements for damages suffered by the companies for losses sustained by President Cardenas' expropriation decree.

On the other side of the fence, a bulletin issued by the Institute for Judicial and Social Studies, a Mexican publication, accused the companies of owing millions of pesos to the government, accused the companies of being liable for heavy fines for allegedly having extracted petroleum from many zones without the necessary government permits. The bulletin avers that if the accused are prosecuted on these grounds such action must not be taken as a political move or one of government vengeance.

Different Valuations

It is interesting to note in connection with the above that while the values placed upon oil properties of the 17 American and British oil companies which were confiscated have generally ranged from $400,000,000 to $450,000,000, the properties were estimated as worth $100,000,000 by the Mexican industrial census of 1935, according to an Associated Press dispatch.

Najera's Opinion

Returning home to Mexico City from Washington early in the week, Ambassador Francisco Najera, speaking of the oft discussed possibility of the return of the properties to the companies, is quoted as saying: "That is out of the question." He characterized as imaginary reports that the oil companies would offer Mexico $150,000,000 for right to operate the expropriated industry 50 years.

Trend Will Continue

Mexico's taking over of oil properties, directly or indirectly, apparently will continue. A recent official decree embargoed all movable and immovable properties belonging to La Imperial, an independent company operating in Vera Cruz state. In this case the decree was issued because the company had bucked certain stipulations laid down by the department of labor, which had attempted to force the company to meet the requirements of the labor law in regard to a collective contract and in regard to certain indemnities for its workers. The company is reputed to have offered to allow the workers part in the management if they would withdraw the accusations against it.

CORRECTION

In the January 30 issue of THE OIL WEEKLY, page 64, there appeared the statement, "drilling at Masjidi-Sulieman has been finished." This statement is incorrect, according to information received from W. D. Brown, representative in the United States for the Anglo-Iranian Oil Company, Ltd. THE OIL WEEKLY is glad to make this correction.

Tariff commission gives data on imports of petroleum

Imports of crude oil from Mexico during the first 10 months of 1938 totaled 1,471,000 barrels valued at $1,304,000 while receipts from Venezuela amounted to 19,336,000 barrels valued at $13,727,000, it was disclosed this week by the House Appropriations Committee with the publication at Washington of testimony of Tariff Commission officials at hearings on their appropriation for the coming fiscal year.

The question of oil was brought up during the testimony of Sidney Morgan, secretary of the commission, by Representative Dirksen (Rep., Ill.), a member of the subcommittee in charge of the Independent Offices Appropriation bill, who asked whether the Tariff Commission had been asked by the Committee for Reciprocity Information for any data relative to imports of oil from Venezuela for consideration in connection with the proposed reciprocal trade agreement with that country.

Oil imports, as well as other imports from Venezuela, have been studied by the commission, Morgan admitted, but pointed out that negotiations for the agreement, which are proceeding actively, are centered largely in Caracas, and no Venezuelan mission has been sent to Washington as yet.

In addition to the crude oil imports, Morgan said, 20,503,000 barrels of fuel oil valued at $12,681,000 were imported from the Netherlands West Indies, most of which he added were the product of Venezuelan petroleum.

Under questioning by Representative Dirksen, Morgan said that while oil imported into the United States pays the excise tax of 21 cents a barrel, the same oil imported into the United Kingdom would pay $6.318 per barrel if in the form of gasoline or Diesel oil, and 70 cents per barrel if entered as crude petroleum.

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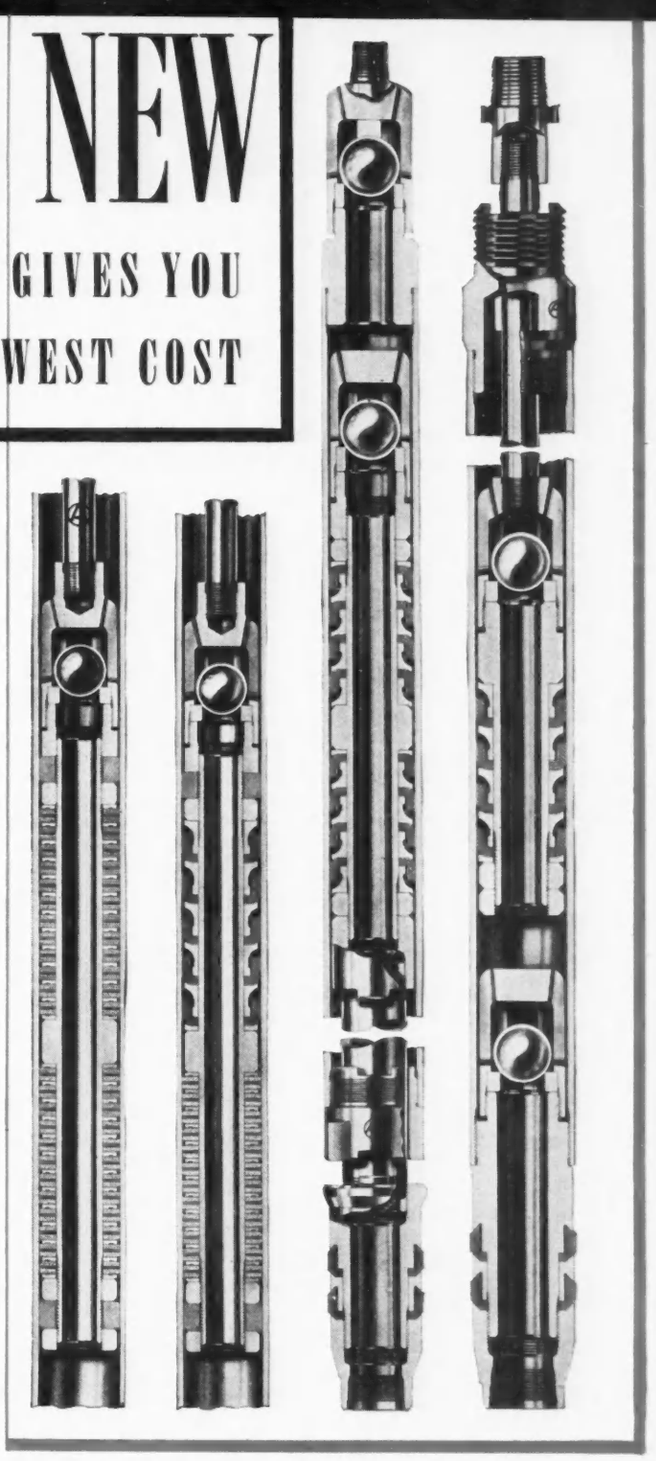

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SELLS AND *SERVICES*
OIL WELL PLUNGER PUMPS
AND SUCKER RODS . . .

African exploration work awaits arrival of rotary

Continuance of the search for oil in French Equatorial Africa pends arrival of rotary drilling equipment. Three shallow holes, the deepest of which only went to 2961 feet, are said to have indicated to Compagnie Francaise des Petroles and the Office National des Combustibles Liquides that the oil, if any, would be found at depths considerably below those originally contemplated. Indications of oil are found in the coastal region of French Equatorial Africa between Pointe Noir and Port Gentil.

British Empire producing fourth of requirements

Production figures for last year indicate that the British Empire is producing from its own resources a little more than a quarter of its oil requirements. The empire's producers, in order of importance, are Trinidad, Bahrein, Burma, Canada, British Borneo and India.

Total requirements of the empire may be placed between 25 and 26 million metric tons of oil per annum, of which the United Kingdom's share amounts to some 11 million metric tons, or about 44 percent.

The empire's production for the past three years is shown in the following table:

British Empire Crude Production
(Thousand Metric Tons)

	1938	1937	1936
Trinidad	2,470	2,253	1,922
India and Burma	1,425	1,381	1,366
Bahrein	1,150	1,061	639
Canada	940	366	201
British Borneo	895	793	703
Total	6,880	5,854	4,831
Empire percent of world total	2.5	2.1	2.0

It will be seen that during 1938 empire production advanced by 17 percent. During the same period world output declined by rather more than 3 percent, so that the British share of the total rose from 2.1 percent in 1937 to 2.5 percent last year. For purposes of comparison, it may be pointed out that the empire's consumption comprises about 10 percent of the world's total requirements.

Looking into the future it is not unreasonable to anticipate an increase in British Empire production. Progress in Trinidad has been practically uninterrupted for several years and drilling activity has lately been intensified. Bahrein's production could undoubtedly be rapidly increased. Vast areas in India are still unexplored and there is also virgin territory in British Borneo. Australia, New Zealand and British New Guinea are all the subject of oil search.

Italy's crude and refined product output declines

Italian domestic production of crude petroleum during December, 1938, totaled 986 metric tons, a decrease of 74 metric tons or 6.98 percent under the November, 1938, production of 1060 metric tons, and of 50 metric tons or 4.83 percent under the December, 1937, production of 1036 metric tons, according to John L. Goshie of Rome.

The total production of domestic crude petroleum for 1938 amounted to 13,178 metric tons, a decrease of 822 metric tons, or 5.87 percent under the 1937 volume of 14,000 metric tons.

Figures for the production of petroleum products from domestic crude petroleum indicate a decline during December, 1938 (compared with November, 1938), in the production of gasoline, kerosene, fuel oil and gas-oil, and an increase in the quantitatively small production of turpentine substitutes.

During 1938, the production of all petroleum products (except kerosene) obtained from domestic crude was below the level of 1937 production.

Statistics compiled by Goshie on production of domestic crude and petroleum products in Italy during 1938 and 1937 are given in the accompanying table.

(metric tons)

1938	1	2	3	4	5	6
January	1,124	716	43	356	63	35
February	990	464	15	115	37	50
March	1,194	607	42	285	40	30
April	1,175	514	29	416	82	21
May	1,188	575	29	264	48	9
June	1,074	727	34	400	49	..
July	1,164	650	20	330	46	3
August	1,125	523	14	369	71	4
September	1,027	557	78	350	74	..
October	1,071	499	83	383	51	6
November	1,060	483	..	354	58	19
December	986	302	14	170	33	16
Total	13,178	6,617	401	3,792	652	193

1937	1	2	3	4	5	6
January	1,404	769	..	332	101	82
February	1,218	719	..	396	82	60
March	1,330	874	..	395	87	51
April	1,178	696	..	323	75	45
May	1,218	701	..	379	82	36
June	1,131	661	..	321	73	41
July	1,149	546	..	297	61	27
August	1,106	501	..	202	37	30
September	1,060	664	..	271	86	53
October	1,126	546	13	283	50	50
November	1,044	571	41	177	43	59
December	1,036	581	36	229	40	44
Total	14,000	7,829	90	3,605	817	578

Column heads: 1—Crude Petroleum; 2—Gasoline; 3—Turpentine Substitutes*; 4—Kerosene; 5—Fuel Oil; 6—Gas Oil.

Note: (*) Up to October, 1937, the data for the production of kerosene include the production of turpentine substitutes.

Crude Petroleum Imports

Italian imports of crude petroleum during 1938 totaled 1,474,171 metric tons, an increase of 538,302 metric tons, or 57.52 percent over the 1937 imports of 935,869 metric tons.

United States is Italy's principal foreign source of supply for crude petroleum. In 1938, the United States supplied 58.52 percent of the total imports and in 1937, 54.42 percent. Iraq is the second principal source, having supplied in 1938, 16.03 percent of total imports and in 1937, 22.74 percent.

The 1938 import statistics indicate that 83,459 metric tons of crude petroleum were imported from "other insular countries of Central America." According to the Italian official import origin designations, this group includes the following islands: Curacao—including Aruba, Bonaire, Saint Eustasius, Saba and the northern part of Saint Martin, Guadeloupe and its dependencies, U. S. Virgin Islands and Martinique.

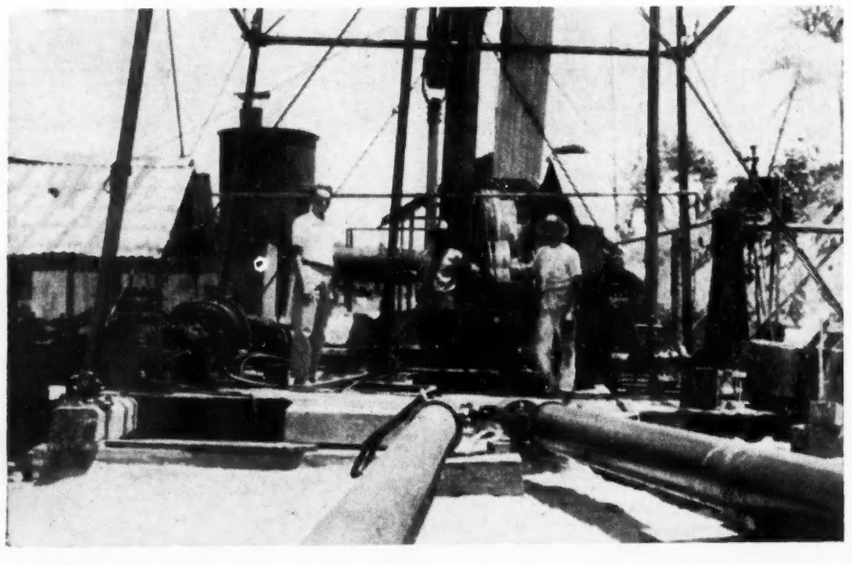
Plan wildcat drilling on Yugoslavian concessions

Yugoslavia is scheduled to be the scene of serious exploratory efforts if credence can be given press dispatches that Yugoslavian Exploration Company, reported to be a subsidiary of Standard Oil Company of New Jersey, has been granted concessions there and has agreed to spend 200,000,000 dinar on prospecting work. It is reported the government will retain from 12 to 15 percent royalty on any oil produced.

Brazil makes Lobato area national oil reserve

Advice from Aldene A. Barrington, American trade commissioner at Rio de Janeiro, is that the president of Brazil has issued a decree establishing a certain area around Lobato, scene of a recent wildcat strike, as one which will not be available for exploitation concessions. A rough translation of a part of the president's decree follows:

"Until further notice there is constituted as a petroleum reserve in the Reconcavo region, State of Bahia, the area within a radius of 60 kilometers from well No. 163, situated at Lobato, near the city of Salvador, in which area authorization will not be granted for oil drilling nor for the exploitation of deposits of petroleum and natural gases."



This is the rig used to drill the wildcat on Riacho Doce anticline, Alagoas, Brazil, by Compania Petroleo Nacional. An early issue of The Oil Weekly will present Part 2 of a series on Brazil.

MEN IN THE INDUSTRY'S NEWS

GLENN SLEIGHT, Mt. Pleasant, resident field geologist and chief scout for Sun Oil Company, has been elected president of the Michigan Scout's Association. He succeeds Kurt deCousser who resigned as president and as a member of the association following his appointment by Socony-Vacuum Oil Corporation as general superintendent in Michigan in charge of the producing, land and geological divisions. Dean Shackelford, chief scout for Pure Oil Company, was named secretary-treasurer, succeeding Sleight. John P. Lewis will take deCousser's place in the scout association and "check."

W. B. BERWALD, who was with the United States Bureau of Mines for 15 years, is now a member of the engineering staff of Ohio Oil Company at Tulsa headquarters. Berwald was at the Bartlesville experiment station at the time of making the connection with Ohio Oil Company.

GEORGE STRAWN, Ardmore, has been elected president of the Southern Oklahoma Oil & Gas Association, a post held formerly by Charles Clow. Dr. H. B. Alspaugh, Duncan, and William H. Smith, Ardmore, are the vice presidents. J. R. Layne was reelected secretary-treasurer.

MILLARD SMITH, who has been in the Oklahoma City headquarters of Anderson-Prichard Oil Corporation, has been transferred to Shreveport as head of a district office.

DR. CHARLES H. TAYLOR of the school of geology, Oklahoma University, was the speaker for the weekly luncheon of the Oklahoma City Geological Society, February 27. He discussed the Wichita Mountains of southeastern Oklahoma, a phase of the study of the Anadarko basin which the society is considering.

CHARLES W. HONESS, a member of the Kansas geological staff of Gulf Oil Corporation, was transferred March 1 to the division office at Indianapolis, Indiana.

R. L. AKIN, superintendent for British American Oil Producing Company, is making his headquarters in Dallas.

DR. CHARLES H. TAYLOR, of the school of geology at the University of Oklahoma, discussed the Wichita mountains of southwestern Oklahoma before the Oklahoma City Geological Society last week.

N. E. TANNER, minister of lands and mines for Alberta, Canada, returned to Edmonton last week from Ottawa, where he discussed a proposal of British interests to construct a crude oil pipe line from Turner Valley to the Great Lakes.

WALTER J. MORRISON, Bonita Delapp and T. Gentry last week organized Rantex Pipe Line Company, Inc., as a Texas corporation with headquarters at Houston.

LORING L. TONKIN, vice president of Hope Natural Gas Company of West Virginia, has been named president of the company, succeeding Howell C. Cooper, resigned.

E. P. HUBBARD, Gulf Oil Corporation, was elected president of the Houston Technical Club last week, succeeding I. W. Alcorn of Pure Oil Company. O. A. Schillings, Mid-Continent Supply Company, was selected vice president. J. O. (Nick) Carter, Hunt Tool Company, was named secretary-treasurer.

D. R. ZACHRY, manager of American Liberty Pipe Line Company, Dallas, was in Chicago the past week on a business mission.

BERT FIELDS, Dallas producer and drilling contractor, and Paul D. Beaird, office manager, departed last mid-week for Illinois to witness completion of a McClosky lime prospect drilled by Fields, Coates et al near Shawneetown.

W. T. HOLLIDAY, president of Standard Oil Company of Ohio, last week was named chairman of a committee for a study of the depression appointed by the National Association of Manufacturers. A. W. Robertson, chairman of Westinghouse Electric & Manufacturing Company was appointed chairman of the organization's committee on national defense and industrial mobilization.

JAMES R. DOUHERTY, SR., S. F. Hurlbut and Mrs. Christie Hewitt last week organized H. D. & H., Inc., as a Texas corporation. Headquarters have been established at Beeville.

D. L. GILLAND, of Birmingham, Alabama, was re-elected president of the Seaboard Oil Company when stockholders held their annual meeting in Columbus, Ohio, recently. Other officers named are T. N. Asbury, vice president and general manager; E. T. Howson, secretary and treasurer, and C. B. Watson, W. F. Burdell, Rawleigh Warner, R. L. Milligan, George T. Wofford and Curtis Dawes, directors.

W. K. WARREN, president of Warren Petroleum Corporation, returned to Tulsa recently from a vacation trip with Mrs. Warren to Miami Beach and Havana.

J. F. GRAHAM, Inez Graham and J. F. Graham, Jr., last week organized the Tytex Oil Company. The firm will make its headquarters at Tyler, Texas.

JOHN O'SHAUGHNESSY, vice president of Lario Oil & Gas Company, production subsidiary of Globe Oil & Refining Company, underwent an emergency appendectomy last week in Wichita, Kansas. His condition was described as good.

N. W. BASS, resident geologist at Tulsa for the United States geological survey, discussed "Relationship of Crude Oils from the Mississipian Lime and the Shoestring Sands of the Cherokee Shale in Osage County and Part of Southern Kansas" before the Shawnee Geological Society last week. H. M. Smith of the United States Bureau of Mines, reviewed a recent paper of Dr. C. K. Leith on "Polegminerals in the Present Economic Situation."

W. B. EMERY, former geologist at Casper, Wyoming, for Ohio Oil Company, has been transferred to the company's headquarters at Findlay, Ohio.

E. W. SINCLAIR, president, and J. W. Carnes, vice president of Sinclair Refining Company, spent several days last week in Fort Worth, where the company maintains sales headquarters for the Southwest district. The officials are making a routine inspection of company properties, having previously visited the West Coast centers, and made the jump to Texas by plane. They are due to return to their New York offices early this week.

A. L. McCOLL, head of Socony-Vacuum Oil Company in Great Britain and Ireland, with headquarters at London, was the luncheon guest of E. R. Brown, chairman of the board of the Magnolia Petroleum Company, in Dallas last week. McColl, accompanied by his son, Alastair McColl, is visiting Texas oil centers.

O. C. BAILEY, chairman of the newly created Arkansas Oil and Gas Commission which supersedes the old Arkansas Board of Conservation, has announced no changes will be made in the commission's personnel. A. M. Crowell, who served as chief conservation agent for the old board will remain with the commission with the title of director of production and conservation. Miss Jessie Ruth Benton will remain as secretary and office manager, assisted by Miss Martha Shugart. C. H. Thigpen remains chief engineer; J. Alton Simms, senior petroleum engineer; and Lloyd L. Jordan, senior engineer. Headquarters will continue at El Dorado.

J. R. SIMPSON was re-elected president of Home-Stake Oil & Gas Company and of the Home-Stake Royalty Corporation, when the firms held their annual meetings in Tulsa last week. Other officers named are J. C. Greer, vice president, and F. B. Garden, secretary-treasurer. Directors of Home Stake Oil & Gas are R. G. Cunningham, Ben Gutman and the officers. Directors of Home-Stake Royalty are R. S. Wilkinson, Joe K. Trauerman, William Gibbs McAdoo, G. E. Cress, Cunningham and Gutman.

FRED PHILLIPS, independent operator currently active in Kentucky, was in Tulsa last week.

E. G. HOLLINGSWORTH, independent operator, returned to Evansville, Indiana, last week from Wichita Falls, Texas, where he purchased a new rig.

G. E. LAMB, 57, member of the firm of Kirkpatrick & Lamb, drilling concern, died February 23 at Big Spring, Texas, of a heart attack. Surviving are his wife, two sons and two daughters. Burial was at Brownwood, Texas.

MORRELL McKENZIE SEARS, 45, retired oil operator, died at the home of his mother, Mrs. R. L. Sears, at Whitewright, Texas. Besides his mother, he is survived by two daughters, a brother and two sisters.

R. H. HUDSON became counsel of Phillips Petroleum Company March 1, an advancement from the post of general attorney, a position he held for 17 years. The change was part of a reorganization

of the legal department of the company, which is under Don Emery, vice president and general counsel. Rayburn L. Foster, former general attorney at Bartlesville and H. B. F. Hummer, who has been in charge of the Oklahoma City legal division, became general attorneys and Hummer will make headquarters at Bartlesville. H. D. Turner, who has been assistant at Oklahoma City, will have charge of the legal work in that office.

KRAFT W. EIDMAN, W. H. Marshall and Chatten Cowherd have organized Exploroil, Inc., as a Texas corporation with headquarters in Houston.

JUDGE E. H. FOSTER, Phillips Petroleum Company, has been named a director of the Mid-Continent Oil & Gas Association.

HARRY HOLLENBACH, independent operator, has returned to Oklahoma City from a short stay in Illinois.

SAM F. BOWLBY, chief exploitation engineer for Shell Petroleum Corporation, Houston, was the guest speaker February 28 before the Petroleum Engineering and Geology Club at Texas A. & M. College. This club is the student affiliate branch of the American Institute of Mining and Metallurgical Engineers at the college. Bowlby's subject was: "What a Major Oil Company Expects of Its Petroleum Engineers." The meeting was attended by 196 members.

R. K. MILLER, geologist for Shell Oil Company of California, was in Calgary last week to obtain information on Alberta oil development.

DR. J. P. MINTON, director of geophysical laboratories at Dallas for Magnolia Petroleum Company, discussed "Electrical Aspects of Petroleum Geophysics" before the monthly meeting of the Dallas section of the American Institute of Electrical Engineers last week.

HAROLD B. SCHUM, assistant treasurer for Hope Natural Gas Company since 1933, has been named president of River Gas Company, a subsidiary. He succeeds Howell T. Cooper, who recently resigned.

DR. F. V. L. PATTEN, member of the Texas Railroad Commission staff, of Austin, spoke at the Houston Geological Society's weekly meeting March 2, on the subject, "Phase Equilibria and High Pressure Gas Reservoirs."

O. D. CRITES, Shell Petroleum Corporation, has returned to his Houston office after a trip to St. Louis.

DIED:

JOHN CONRAD GALLAGHER, 56, died February 11 in Yenangyaung, Upper Burma, as the result of an automobile accident the preceding day. At the time, he was field manager for Pyinma Development Company, Ltd., jointly owned by Indo Burma Petroleum Company, Ltd., and British Burma Petroleum Company, Ltd.

Gallagher was born in Foxburg, Clarion County, Pennsylvania, in 1882, but moved to California in 1890.

Gallagher devoted his life to the oil industry having started in Los Angeles, where he worked on the first well drilled by the late E. L. Doheney. He moved to Bakersfield in the early days of the Kern River oil field and was employed as a driller by Kern River Oilfields, Ltd.; thence to Trinidad, B.W.I., and Venezuela for nine years and finally to Burma in 1921 as drilling foreman for Indo-Burma Petroleum Company, Ltd.

JOHN HOWE McCLURKIN, 65, independent operator recently active in Gibson County, Indiana, died February 23 of pneumonia in Bowling Green, Kentucky.

FRANKLIN DELBERT HARRIS, 76, former superintendent of leases for South Penn Oil Company, died February 20 at his home in Parkersburg, West Virginia.

GEORGE E. LAMB, 57, Brownwood, Texas, producer and contractor, died February 23 of a heart attack while on a business mission to Big Spring, Texas. He was a member of the firm of Kirkpatrick & Lamb.

Texas A. & M. prize winners announced

Winners of prize winning papers prepared by senior petroleum engineering students at Texas A. & M. College on practical subjects relating to the oil industry, have been announced by Harold Vance, head of the Petroleum Engineering department. The papers were a part of the regular scheduled work of senior students and cash prizes for the best paper and second best paper have been provided the winners by manufacturers.

Following are the subjects and prize winners:

Drill-pipe protectors: First, J. L. Van Atten; second, W. A. Teller.

Blowout preventers: First, L. A. Walls; second, W. A. Orth, Jr.

Sucker rods; No first awarded; second, T. S. Clopton.

Development of underground casing perforators: First, J. D. Stukenburg; second, J. R. Orbison.

Oil-well cementing equipment: First, none; second, J. A. Laird.

Mud fluids: First, none; second, E. A. Radack.

Oil-well pumps: First, none; second, H. H. Halsell.

National Safety Council to meet in Atlantic City

The 1939 National Safety Congress and Exposition will be held in Atlantic City, October 16-20. The Safety Congress is the annual meeting of members and committeemen of the council and brings together approximately 10,000 safety leaders from all parts of the world.

This year there will be 130 sessions and 600 speakers at the congress, touching on every phase of safety—industrial, traffic, home, school and public.

The decision to hold the congress in Atlantic City was made by the executive committee of the council following a formal invitation extended in Trenton by a group of New Jersey business leaders.

The Sponsoring Committee which will handle local arrangements for the congress is headed by Governor Harry E. Moore of New Jersey as honorary chairman and General Edward C. Rose, president of Public Service Electric & Gas Company of Trenton, New Jersey, as general chairman.

Southwestern A.P.I. program announced

Ten subjects of vital importance to the oil producing business of the southwest will be discussed at the spring meeting of the Southwestern District, Division of Production, American Petroleum Institute, to be held at San Antonio March 17 and 18.

The opening session at 9:30 a.m. will be preceded by a breakfast meeting at 8 a.m. for officers of the division, presiding officers, and contributors of papers in a private dining room on the hotel's mezzanine floor.

The program will include a discussion of condensate production, appraisal of oil properties, economics, methods of operating and producing wells, trends in pipe standards, and other interesting subjects. The program follows:

Thursday, March 16

8:30 A. M. Registration. A fee of $1.50 will be charged each registrant, to cover incidental costs of meeting and advance copies of papers.

9:30 A. M. Morning Session. E. P. Hubbard, Gulf Oil Corporation, Houston, Texas, presiding. (1). Address of Welcome. Response by W. S. Morris, chairman of the Southwestern District. (2). Announcements by Al A. Buchanan, chairman of San Antonio Arrangements Committee. (3). "Petroleum Engineering Education and Its Relation to the Petroleum Industry," by Harold Vance, A. & M. College of Texas, College Station. (4). "Appraisal of Oil Properties," by T. A. Hall, First National Bank in Dallas, Dallas, Texas.

Thursday Afternoon

2:00 P. M. General Session. W. S. Morris, East Texas Engineering Association, Kilgore, presiding. (1). Address by W. R. Boyd, Jr., executive vice president, American Petroleum Institute, New York. (2). "The Economic Effect of Proration on Well Spacing," by W. B. Pyron, vice president, Gulf Oil Corporation, Houston. (3). "The Gasoline Tax Situation in Texas," by Datus E. Proper, executive vice president, Texas Good Roads Association, San Antonio. (4). Announcements.

Thursday Evening

Stag entertainment. Details will be announced later.

Friday, March 17

8:00 A.M. Breakfast meeting for officers of Southwestern District, presiding officers, and authors in private dining room, mezzanine floor.

9:30 A. M. Morning Session. L. A. Ogden, The Pure Oil Company, Fort Worth, presiding. (1). "Developments in Discovery and Production Practices in Southwest Texas," by C. H. Row, Sun Oil Company, San Antonio, and R. H. McLemore, Sun Oil Company, Dallas. (2). "Trends and Developments of A.P.I. Pipe Standards," by C. A. Dunlop, Humble Oil & Refining Company, Houston. (3). "Well Completion Data," by S. F. Bowlby, Shell Petroleum Corporation, Houston. (4). Election of District Officers and Committees. Report of Nominating Committee (A. G. Levy, Chairman).

Friday

2:00 P. M. Afternoon Session. P. D. Torrey, The Sloan & Zook Company, Houston, presiding. (1). "Condensate Wells — Completion and Recycling Operations," by E. V. Foran, Parker, Foran, Knode & Boatright, Austin. (2). "Recovery of Condensate from Distillate Wells," by Emby Kaye, Tide Water Associated Oil Company and Seaboard Oil Company of Delaware, Tulsa. (3). "Laboratory Technique and Equipment for the Study of Condensate," by W. F. Fulton, Union Producing Company, Houston, Texas.

Friday Evening

Al Buchanan, chairman of the local arrangements committee, advises that it is planned to have a dinner-dance for this evening. Complete plans for this entertainment will be announced at the opening session of the meeting. Tickets will be available at the registration desk.

THE WEEK'S NEWS SUMMARIZED

Allowables

Allowables adopted by the six leading producing states, exclusive of Illinois which does not have proration, promise better balancing of supply with demand in March than existed in February. Allowables of the six states are 2.5 percent under the Bureau of Mines' estimate of market requirements, whereas they were 1 percent higher than this figure in February.

Oklahoma and Texas have March allowables considerably under indicated demand, Louisiana is slightly under also, while New Mexico's allowable is the same as estimated requirements. However, Kansas and California have allowables somewhat larger than indicated demand.

A meeting of much importance will take place in Austin on March 15, when Texas' allowable course will be determined for the forthcoming months. Present plans are to have oil company executives appear and offer their views on the industry's position. It is likely that the principal subject will be the trend of market demand during the second quarter of 1939.

Potential rating for the 18,949 wells in Kansas rose to 3,926,263 barrels daily as of February 20, a new all-time peak. A month previous the potential rating was 3,713,327 barrels from 18,786 wells.

Legislation

The Senate has decided not to hold open hearings on the measure that would make the Connally hot oil act permanent. It was felt by a Senate committee that the subject had been covered in hearings held in the past. However, interested parties were invited to file briefs, which will be considered before reporting the measure. Meanwhile, a similar bill has been introduced in the House of Representatives.

Federal control for the oil industry will materialize within a year unless economic problems confronting the business are corrected at once in the opinion of Charles F. Roeser, president of the Independent Petroleum Association of America. Rising gasoline stocks, unnecessary drilling, unpredictable imports, and inequalities in division of production between states were listed as major problems.

Enactment of a proposed 2 percent severance tax in California would cause the closing of many stripper wells, throwing hundreds out of work, oil men declared last week.

A hearing is to be held March 15 on a bill that would extend the powers of the Texas Railroad Commission to include regulation of refineries.

The long-awaited report of Pennsylvania's oil industry investigating committee may be forthcoming within the next week or two.

Statistics

Latest statistics on the inventory position of the industry were predominantly unfavorable, despite the withdrawing of 1,500,000 barrels from fuel oil storage.

Although gasoline production dipped from 9,641,000 to 9,450,000 barrels during the week, stocks of gasoline rose 1,522,000 barrels to 84,597,000 barrels. This was still 6.1 percent below a year ago, but above the 80,500,000 barrel limit considered as the maximum volume desired from an economic viewpoint.

Crude stocks increased about 500,000 barrels, and now stand at 271,252,000 barrels, or 11.1 percent below the level of a year previous.

Fuel oil stocks now are but 9.5 percent greater than a year ago, totaling 133,671,000 barrels.

Prices

Markets for crude oil remain disturbed by over-production in Illinois, Michigan, California and some Mid-Continent districts. However, there are a few signs of improvement. Pipe line proration in the K-M-A field was partly lifted on March 1, and an independent concern advanced Magnolia (Arkansas) crude 5 cents per barrel. Meanwhile, there is considerable tank construction reported contemplated or actually underway.

On the other hand, prices in northeast Oklahoma and southeast Kansas were reduced 22 cents per barrel by National Refining Company, buyers of 6300 barrels daily in the area.

Refined markets are marking time, the few price changes taking place being without great significance.

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Allowable Picture

Leading states fix March allowables beneath Bureau estimate of demand . . . General economic situation of industry to be studied at Texas proration hearing.

March allowables promise stricter crude control

Better balancing of crude oil production with market demand is in prospect for March, under the allowables adopted for the month by the more prominent producing states. The curtailment promises to be more effective than that in February, when allowables were somewhat less strict.

The six leading states exclusive of Illinois, which does not have proration, have adopted March allowables that are in the aggregate 75,993 barrels daily, or 2.5 percent, under the available market demand for domestic crude as estimated by the Bureau of Mines. Those states account for nearly 90 percent of all United States crude oil production.

In February the allowables of the same states were 27,970 barrels, or 1 percent, above indicated demand.

Under the February allowables, crude production was larger than economically desirable, having resulted in some over-building of gasoline stocks as well as a moderate increase in crude oil stocks.

Under the March curtailment, however, more favorable fluctuations of crude and refined oil inventories may be expected, as current output of wells and refineries probably will be more nearly in line with the current consumption.

Oklahoma and Texas have March allowables considerably under indicated market demand, and Louisiana is slightly under also, while New Mexico's allowable is the same as the Bureau of Mines estimate of demand. Kansas and California, in contrast, have allowables somewhat larger than indicated market demand. The details of the March allowables and of indicated demand appear in an accompanying table.

Although these allowables are encouraging, some of the states, especially California and Louisiana, regularly are unable to stay within the established limits. Consequently, actual production commonly runs considerably above the level of combined allowables.

Economic trends to be discussed at Texas hearing

Plans have been made to develop at the Texas statewide hearing, scheduled for March 15 at Austin, data similar to that which was offered at the December hearing of the commission. At that time, prominent oil executives from the major companies appeared on the witness stand and offered their views of the oil industry.

Of equal importance was the appearance of refinery operators to give their view of crude and refined products demand for the three months ending April 1, 1939.

It is authentically reported that one of the principal reasons for announcing the date of the March hearing so far in advance was to enable these executives to arrange their plans for an appearance in Austin. Because of the pleasant reception they received at the December hearing, it is believed most of them will return if invitations as pressing are extended.

The conditions now indicate that the principal subject to be discussed would be the trend of market demand for the next three months of 1939. Some increase in demand is normally expected because of the Spring and Summer demand for gasoline, but whether this increase will justify higher allowables for Texas oil wells is the question to which the Rialroad Commission will seek an answer.

If the demand is sufficient, the increase is most likely to take the form of lifting the Saturday shutdown, rather than a general increase in individual field allowables.

One of the most important factors to be considered is the daily average runs to stills for the three months ending April 1, and the quantity of gasoline on hand at that time. If the storage figures show much more than 80,000,000 to 83,000,000 barrels of gasoline* as of April 1, it would appear that there is little need for an immediate increase in crude allowables. However, the production trend has been fairly static since the first of December and has shown a slight decline through February. For that reason, some increase in production allowables may be permitted his summer.

There is little reason to expect that any change in proration orders will result from the statewide proration hearing held in Austin on February 20. Commissioner Lon Smith, however, has obtained from the Engineering Department of the commission figures showing the results to be obtained if state allowables were revised according to a plan offered at that meeting.

Smith has consistently opposed closing wells two days a week, and at the statewide hearing a plan was offered by F. W. Fischer, Tyler attorney, providing for abandonment of the shutdown plan and the assignment to each well of the allowance fixed by the marginal well statute and the proration of the remaining demand among non-marginal producers on the basis of reserve in place.

The data from Commission Chairman Smith indicated that if this plan were adopted, a one-day shutdown would keep production figures within market demand, and as Smith put it, "there would not be much difference, no matter how it is done."

The Texas allowable, Smith pointed out, now averages 1,318,457 barrels daily, with the two-day shutdown. This would be increased to 1,559,935 barrels with wells closed in only one day under the present method of allocation. However, under the plan that was suggested at the hearing, Smith pointed out that it would be necessary to assign 1,267,217 barrels to the 86,270 wells producing in Texas, this assignment being made on a marginal basis. Only 170,000 barrels would be assigned to the true marginal allowance, and the remaining 1,097,217 barrels would be oil assigned to non-marginal producers.

Thus, there would remain about 50,000 barrels of oil to be assigned among non-marginal producers on a reserve basis, and still keep the total Texas allowable within present figures.

Because of the endless difficulties which would arise from the application of such a plan, it is doubtful that it will ever be instituted. However, it is well worth consideration, and it may be one of the principal topics discussed at the hearing on March 15.

*Gasoline stocks last week rose to 84,597,000 barrels, indicating they may reach 90,000,000 barrels by April 1.

California daily allowable remains 600,000 barrels

California's crude allowable for March was again set at 600,000 barrels daily, but with a reduction in the tolerance, at the regular monthly meeting of the Central Committee of California Oil Producers. Tolerance was cut from 5000 to 2000 barrels daily.

The committee also authorized the

Leading Producing States Have March Allowables Below Indicated Market Demand for Domestic Crude

STATE	Bureau of Mines Forecast of Demand	State Allowable Beginning of Month	Excess or Deficiency of State Allowable	Percent Excess or Deficiency
California	588,400	*602,000	+ 13,600	+ 2.3%
Kansas	150,300	156,850	+ 6,550	+ 4.4%
Louisiana	259,700	254,200	— 5,500	— 2.1%
New Mexico	109,700	109,700	.....	.....
Oklahoma	473,200	428,000	— 45,200	— 9.6%
Texas	1,363,900	1,318,457†	— 45,443	— 3.3%
Total six States	2,945,200	2,869,207	— 75,993	— 2.5%
Other States	394,800	.....	.....	.....
Total United States	3,340,000	.....	.....	.....

* Recommendation of Central Committee of California Oil Producers.
† Average daily production permitted for 7 day week as whole; actual daily allowable higher, but fields shut-in on Saturdays and Sundays.

East Coalinga Eocene pool operators to organize a field committee of their own which will select a representative to serve with the central committee. The committee also authorized the operators of other new fields in the San Joaquin Valley to select a field committee and to elect a member to represent them on the central committee. These include such new discoveries as Coles Levee, Canal, Rio Bravo, Wasco, Greeley, Ten Section and Western.

Dana Hogan informed members of the central committee that he will urge the passage of a resolution calling for a top allotment of 150 barrels per well for any well spudded on and after March 15, believing that such a move would discourage drilling.

Oklahoma unchanged except in Class D

The only major change in the proration schedule for March in Oklahoma was an increase from 100 barrels to 125 barrels daily for wells in Class D pools. Daily allowable for the state was left at 428,000 barrels, identical with the allowable for the past eight months. Demand for Oklahoma oil, as estimated by the United States Bureau of Mines, was 473,200 barrels daily.

There are 14 pools in the Class D rating and 253 producing wells. The increase was granted on the plea of producers, chiefly those in the West Little River pool, which has 6 wells producing. This field will come before the Oklahoma Corporation Commission on a complaint which charges violation of the 10-acre spacing regulation from a whipstocking operation. Commercial Drilling Company and J. F. Smith have filed the charge against Rogers and Rogers, Inc., whose offset to the first producer was plugged back and whipstocked to make a producer after failing to get oil. The plaintiffs charge that the operation placed the bottom of the hole so "it was not bottomed under the center of the 10-acre tract on which it was located."

Potential for Kansas wells reaches all-time high

Potential rating for the 18,949 wells in Kansas rose to a new high level of 3,926,263 barrels as of February 20. The calculation was based on 4953 wells in the prorated fields, rated at 3,844,236 barrels, and 13,882 wells in non-prorated, minimum wells, rated at 42,027 barrels daily. A month previous the potential rating for the state was 3,713,327 barrels, based on a rating of 18,876 wells.

Beginning March 1 the proration division of the Kansas Corporation Commission started its work of taking potential tests on the wells under proration. Actual physical tests are a requirement each year, and the output is used for determination in computing monthly decreases in potential under the provisions of the withdrawal decline curve. Only fields which have been granted the privilege of bottom-hole or fluid-level measurement in potential determination are exempt from the physical tests. Fields with these methods are Zenith, Stafford County; South Trapp, Barton County; and Bemis, Ellis County.

Operators in the Schroeder pool, Ellsworth County, and the Schneider pool, Russell County, are seeking approval of the fluid level method for potential determination in these fields.

Morgan heads Kansas conservation department

Reorganization of the Oil and Gas Conservation Department of the Kansas State Corporation Commission was completed March 1 with the appointment of T. A. Morgan as director. He formerly held the position from January, 1934, until July 1, 1937, when he resigned to re-enter the oil business. Recently he has been Kansas representative of Republic Gas Company.

E. G. Dahlgren, who has been director, was named technical adviser, a position that has been vacant since the resignation of Marvin Lee, now a consulting geologist in Wichita.

The change in administrative personnel came a week after the naming of two new members of the commission: A. F. Schoeppel, Ness City, chairman; and Arnold Jones, Topeka, accountant. E. E. Blincoe, Fort School, remains as the minority party representative.

The commission also issued its first order of proration since the two new members were named and fixed the March allowable at 156,850 barrels daily. Testimony was taken two weeks ago by Commissioner Blincoe. Estimated demand by the United States Bureau of Mines was 150,300 barrels daily for March but purchasers submitted nominations of 158,429 barrels.

Oil at the Capitols

Senate decides against public hearing on extension of Connally act, but will take briefs . . . Roeser predicts federal control legislation for petroleum.

Connally act extension bill not to have public hearing

Feeling that the subject has been thoroughly discussed at past hearings, the Senate Finance Committee's subcommittee on oil this week decided to hold no hearings on the Connally bill to make the "hot" oil act permanent law.

Interested parties, however, were invited to file briefs, which will be considered by the subcommittee before reporting on the measure.

The action of the group, reached at a meeting February 28, was seen as foreshadowing a favorable report on the bill in the near future, possibly within a week or 10 days. Meanwhile, a similar bill has been introduced in the House of Representatives by Congressman Martin Dies of Texas.

Under the Connally bill, the "hot" oil act, which expires by limitation this year, would be incorporated in the permanent statutes and the penalty provisions, which a Texas court held had been repealed when the original act was continued two years ago, would be restored to effect.

The subcommittee in charge of the measure consists of Senators Connally, chairman; Guffy of Pennsylvania and Townsend of Delaware.

Roeser predicts federal control for oil

Economic problems confronting the oil industry must be corrected by its leaders else federal control will materialize within a year. This prediction was made by Charles F. Roeser of Fort Worth, president of the Independent Petroleum Association of America, at the annual banquet of the North Texas Oil & Gas Association held at Wichita Falls February 25.

Rising stocks of gasoline, the drilling of unnecessary oil wells, unpredictable imports, and the absence of an equitable division of production between states were listed by the speaker as major problems that must be rectified.

Col. E. O. Thompson, member of the Texas Railroad Commission, stated that various government agencies are throttling business through too much regulation. He expressed faith in the ability of the oil industry to restore its business to normalcy without enlisting the aid of the federal government.

Other guest speakers included Wirt Franklin of Ardmore, former president, and H. B. Fell, executive vice president of the Independent Petroleum Association of America; Peyton F. Gwynn of Wichita Falls, and Gus N. Dyer of Nashville, Tenn., professor of economics, Vanderbilt University.

California oil men fight proposed severance tax

Enactment of Governor Culbert L. Olson's proposed 2 percent severance tax, intended to raise $6,000,000, would force the closing of many California marginal and stripper wells, throwing hundreds of employes out of work, the senate revenue and taxation committee was told by industry representatives during a hearing on the tax proposal last week.

Leading the attack on the measure were Robert Searls, Los Angeles, representing the California Oil & Gas Association, and Jack Hunt, Los Angeles, representing the California Oil Producers Agency, embracing 300 of the state's 1000 independent operators.

Others who spoke against the meas-

ure were Rush Blodget, Los Angeles, of the Oil Producers Agency; W. S. Scully, Los Angeles, general manager of the Independent Refiners Association; Richard Fenton, executive vice president of the California Stripper Well Association, and Thomas McManus, Bakersfield, secretary of the San Joaquin Valley Producers Association.

"In the last analysis, if the severance tax was imposed, the consumer would pay," Searls told the committee. "The producers of crude oil would add the amount of the tax to the price of gasoline, to the full extent possible before consumer resistance made it uneconomic. Then the purchasers would move back against the producers of crude oil, and lower the posted price. The inevitable effect of this would be to force the little fellow out of business first."

A graduated severance tax was recommended by witnesses favoring the proposal on the ground that the state's mineral resources are not produced but merely taken from the land. The state is not obtaining sufficient revenue from oil and the proposed tax is "eminently fair," said Supervisor N. E. West, of Orange County.

Texas legislature studies several oil measures

Several measures now being studied by the Texas Legislature are of vital importance to the oil industry.

The House Committee on Oil, Gas and Mining has scheduled a hearing for the night of March 15, on the bill to extend the powers of the Texas Railroad Commission to include regulation of refineries. Presumably the purpose of this bill is to enable the commission to limit all processing of oil to market demand and thus prevent the concentration of large amounts of gasoline which might have a depressing effect on the market for that product.

Representative C. E. Nicholson of Port Arthur, has announced that his constituents will fight the bill and had asked for greater delay. Port Arthur is a refining center and laborers in the plants are expected to join the opponents of the bill.

The hearing is scheduled for the same day as the statewide proration hearing, set by the Texas Railroad Commission, at which representatives of most of the important refineries are expected to appear.

The House Committee on Education has scheduled a hearing for the night of March 8, on a bill which would divert to the Teacher's Retirement Fund a portion of the Texas oil taxes.

Committees of both House and Senate of the Texas Legislature have reported favorably the bill extending for two years the Interstate Oil Compact Commission. It appears unlikely that there will be opposition to this bill.

The bill to provide income for increased pension payments is to be reported back to the joint committee of the House on Monday, March 6. During the past week opponents of an increase in the oil tax proposed have appeared before the House Committee on Revenue and Taxation and protested that while the industry is still able to pay the tax assessed, other sources of revenue should be called upon to supply additional funds in order to obtain a fair distribution of the tax burden.

Most of the protestants prepared figures to show the tax paid per barrel of production in various counties of Texas. This plan of attack was considered an answer to arguments presented in a mimeographed report from Representative G. C. Morris, advocate of higher natural resource taxes. His figures showed that in Louisiana especially, the tax per barrel was considerably higher than the average paid in Texas. This estimate included severance taxes, ad valorem and other taxes paid by oil operators in Louisiana.

On Tuesday, March 7, the House Committee on Public Lands and Buildings has scheduled a public hearing on the revised bill proposed to correct defects in Texas land laws affecting vacancies. The sub-committee which has been designated to rewrite the bill and attempt to meet criticism of various factions interested in the matter will report back at that time with the revised bill.

Last week the same committee referred to a sub-committee a bill which would revise the terms of the statute governing leases on marsh lands and submerged lands along the Texas coast. The purpose of the bill was said to be to extend the life of these leases to the producing life of the property, instead of 25 years as now provided. The bill would also permit lease owners to dispose of fractional portions of the property, rather than to require the sale of the entire block as leased from the state.

Inspection of the bill indicated, however, that it might be so drawn as to include all surveyed and unsurveyed public school lands and it was sent to a sub-committee for correction of this defect.

At a hearing before the committee on Public Lands and Buildings, arguments were presented concerning the bill proposing a change in the venue statute to require trial of vacancy suits in the county where the land is located. The statute now provides that it may be tried in Travis County or in the county where the property is located.

Advocates of the change proposed insisted that the Attorney General invariably tried these cases in Travis County, and urged that the change be made to reduce the cost of litigation. They pointed out that only one member of the Attorney General's staff need come to the trial if it is not held in Travis County, but that numerous witnesses, attorneys and claimants must come to Austin at far greater expense if the case is tried there.

They belittled the argument advanced in opposition to the change to the effect that no jury was likely to award the state any land in a local District Court. This bill, likewise, was sent to a sub-committee which is to report back at the meeting on March 7.

Pennsylvania investigators' report expected soon

The long-awaited report of Pennsylvania's oil industry investigating commission may be given the legislature some time after mid-March, said Chairman Michael J. Chervenak, Jr., last week.

Records of the commission that had been retained by P. R. Hinkley, chief of a Works Progress Administration project set up to work with the commission, were turned over to the investigating body two weeks ago when State Treasurer F. Clair Ross became sponsor of the project.

New Mexico to continue membership in compact

Legislative action was completed last week on a bill to extend New Mexico's membership in the Interstate Oil Compact. The bill has been sent to the governor for signature.

Market Situation

Prospects for closer balance between crude output and consumption improves market outlook somewhat despite continuation of gasoline stock expansion.

Some improvement of crude oil market is encouraging

The oil industry's markets have remained generally unsettled, although prices have continued mostly unchanged.

The markets appear to have a comparatively firm undertone, which is probably based on various favorable elements in the general situation of the industry.

But definite confidence is lacking, and the attitude of watchful waiting for improvement of the markets is predominant.

Apparently, there is recognition that future trends in the industry will depend materially upon the effectiveness with which crude oil production and refinery runs are balanced with market requirements.

In February both crude output and plant operations were higher than desirable, and inventories of crude and gasoline were increased sufficiently to cause some misgivings.

However, allowables for March are somewhat more strict than those of February, indicating that crude production henceforth will be in better balance with market requirements.

The markets for crude oil remain disturbed because of over-production in

some flush areas, as in Illinois, Michigan, and some Mid-Continent districts. But some slight strengthening of the crude market appears to be under way. In the K-M-A- field of North Texas, for instance, proration of purchases by pipe line companies was for the greater part lifted on March 1, and probably will be completely eliminated shortly. And an independent purchaser of Magnolia, Arkansas, crude has posted a price increase of 5 cents a barrel effective April 1.

Meanwhile, several major companies are actively seeking well connections in the Texas Panhandle, having anticipated demand for several thousand barrels more oil than they are now buying in that area. Moreover, one large purchaser already has made arrangements to take over about 4000 barrels daily of Texas Panhandle crude purchases from another major company, which has replaced the Panhandle oil with takings at K-M-A.

In the various changes that are being made by the different purchasers in lining up crude supplies for coming months, there has also been some strengthening of the market situation in the East Texas field, some well connections having passed from the hands of unwilling purchasers to concerns in need of more oil in that district.

Storage Tanks Being Built

It is perhaps significant, moreover, that several major companies are engaged in considerable crude oil storage tank building and repairing of such tanks in the Mid-Continent and on the Texas Gulf Coast. Humble Oil & Refining Company is said to be planning to erect several large storage tanks with aggregate capacity of over 500,000 barrels on the Texas coast. The Texas Company is building two 114,000 barrel tanks at Port Neches, on the Beaumont-Port Arthur ship channel. Gulf Oil Corporation has completed four 25,000 barrel tanks at Port Arthur, and is building two 95,000 barrel tanks there.

This activity in building and working over storage tanks presumably reflects expectations of comparatively brisk business in the spring and summer and a resultant need for expanded and improved facilities for handling the available business.

This work on tankage is being done, significantly, just in advance of the usual spring pick-up in volumes of business.

Refined Oil Markets

The markets for refined products were largely marking time the past week, and price changes were without great significance.

The gasoline market is fairly firm, as demand is satisfactory and supplies are closely held. Very few changes have been made in the past 10 days in quotations for both the low and high octane grades, although there has been some further sagging of prices for the middle octane classifications.

Some slight improvement in the demand for kerosene and light fuel oils was in evidence the past week, but prices were mostly unchanged.

The markets for the heavy industrial fuel oils continued somewhat listless, as industrial activity remained short of some earlier expectations.

Some interest was displayed in tractor fuels, in anticipation of the commencement of spring agricultural activity.

Weekly statistics are largely unfavorable

The latest weekly statistics of the petroleum industry were predominantly unfavorable, having reflected continued excessive crude oil production, larger than desirable runs of crude to refinery stills, a further substantial increase in gasoline stocks, and another addition to crude stocks. These unfavorable developments largely overshadowed the favorable implications of a 1,500,000-barrel withdrawal from fuel oil storage.

United States crude oil production averaged 3,328,850 barrels daily in the week ended February 25, having increased slightly above the previous week's level. The new rate of output was 2/10 of 1 percent higher than that in the corresponding week last year.

Crude runs to refinery stills were increased 60,000 barrels to 3,185,000 barrels daily in the week ended February 25, and were then ½ of 1 percent larger than in the corresponding week last year.

Gasoline production dipped to 9,450,000 barrels from 9,641,000 barrels. But finished and unfinished gasoline stocks increased 1,522,000 barrels to 84,597,000 barrels, as the output of gasoline despite the decline of the week, remained well above the current market demand. Although comparatively high, the gasoline stocks at the 84,597,000-barrel level were 6.1 percent below the level of a year previously.

Crude oil stocks were increased about 500,000 barrels in the week ended February 18, having risen to 271,252,000 barrels. However, those stocks were 11.1 percent smaller than the supply held one year before.

Inventories of gas oil and fuel oil were reduced about 1,500,000 barrels, to a total of 133,671,000 barrels, in the week ended February 25. They were then 9.5 percent larger than at the corresponding time last year. But demand for fuel oil is up similarly.

Imports of crude and refined oils advanced to 1,083,000 barrels for the week ended February 25, from 769,000 barrels in the previous week.

Oil Industry's prices generally unchanged

Although some changes were made last week in prices of both crude and refined oils, no definite trends were followed, some revisions having been upward and some downward.

However, the prices of gasoline, chief revenue producing product of the industry, tended to sag in most instances where changes occurred.

An announcement was made at Shreveport, Louisiana, that effective April 1, Dixie Pipe Line Company, headed by G. H. Vaughn, would increase the price of Magnolia (Kerr Lynn), Arkansas, crude 5 cents a barrel, to 80 cents.

The low and high octane gasolines were generally unchanged in price last week in both the Oklahoma-Kansas and the Chicago markets, but maximum quotations on the middle octane grades were marked

Trends of United States Production and Stocks

Figures are from American Petroleum Institute weekly reports, except those on crude stocks, which are from Bureau of Mines weekly reports

WEEK ENDED	Crude Oil Production (Barrels Daily)	Crude Runs to Stills (Barrels Daily)	Crude Oil Stocks (Barrels)	Gasoline Stocks (Barrels)	Gas & Fuel Oil Stocks (Barrels)
September 25, 1937	3,666,300	*3,455,000	307,974,000	65,620,000	116,472,000
March 19, 1938	3,322,550	3,080,000	306,380,000	*93,192,000	122,067,000
March 26	3,405,600	3,080,000	307,557,000	92,858,000	122,979,000
April 30	3,396,150	3,215,000	307,147,000	91,339,000	128,270,000
May 28	3,098,650	3,150,000	301,583,000	87,946,000	134,315,000
June 25	3,083,900	3,025,000	293,463,000	82,412,000	137,801,000
July 30	3,316,400	3,240,000	288,514,000	76,864,000	144,294,000
August 27	3,388,500	3,255,000	285,029,000	71,754,000	146,926,000
September 24	3,251,150	3,220,000	280,278,000	68,605,000	150,468,000
October 1	3,231,800	3,235,000	280,852,000	68,602,000	151,759,000
October 29	3,237,500	3,145,000	275,824,000	67,590,000	153,719,000
November 12	3,243,250	3,180,000	273,394,000	67,551,000	*154,666,000
November 26	3,260,900	3,295,000	270,563,000	68,628,000	153,634,000
December 10	3,245,100	3,150,000	†269,509,000	68,587,000	150,779,000
December 31	3,201,450	3,115,000	273,024,000	71,695,000	144,823,000
January 28, 1939	3,248,250	3,235,000	271,763,000	77,279,000	139,349,000
February 4	3,441,950	3,140,000	272,214,000	79,149,000	137,589,000
February 11	3,283,700	3,130,000	270,753,000	80,950,000	137,241,000
February 18	3,324,300	3,125,000	271,252,000	83,075,000	135,096,000
February 25, 1939	3,328,850	3,185,000	.....	84,597,000	133,671,000
February 26, 1938	3,322,800	3,170,000	‡305,219,000	90,719,000	120,958,000
Change in past year	+0.2%	+0.5%	—11.1%	—6.1%	+9.5%

* All time peak. † Lowest for 17 years. ‡ Stocks, February 19, 1938.

CRUDE OIL PRICE SCHEDULES

MID-CONTINENT GRAVITY SCALE PRICES

(Posted October 11-13, 1938)

(Some fields of Mid-Continent have flat price postings, and are shown separately).

GRAVITY	[7]Okla.-Kans.	North La.-Ark.	North & W. Central Tex.	East Central Tex.	Gray Co. Tex.	Carson Hutchinson Co. Tex.	[1]Tomball Tex. Type	West Tex.-N. Mex.	[2]Gulf Coast (Tex.-La.)	[3]Some La. Gulf Areas	Jennings, La.	[4]Anahuac, Tex. Type	[5]Refugio,* Tex. Type	[6]Mirando, Tex. Type	[8]Salt Creek, Wyo.
17–17.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
18–18.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
19–19.9	.....	.....	.....	.....	.....	.....	.....	*$0.53	*$0.79	*$0.79	.....	*$0.74	*$0.79	*$0.74	.....
20–20.9	$0.60	.....	.....	.....	.....	.....	.....	.55	.82	.82	.....	.77	.82	.77	.....
21–21.9	.63	.....	.....	.....	.....	.....	.....	.57	.85	.85	.....	.80	.85	.80	.....
22–22.9	.66	.....	.....	.....	.....	.....	*$0.95	.59	.88	.88	.....	.83	.88	.83	.....
23–23.9	.69	.....	.....	*$0.78	.....	.....	.97	.61	.91	.91	.....	.86	.91	.86	.....
24–24.9	.72	*$0.73	*$0.71	.80	.....	.....	.99	.63	.94	.94	.....	.89	.94	.89	.....
25–25.9	.75	.75	.73	.82	.....	.....	1.01	.65	.97	.97	.....	.92	.97	.92	.....
26–26.9	.78	.77	.75	.84	.....	.....	1.03	.67	1.00	1.00	.....	.95	1.00	.95	.....
27–27.9	.81	.79	.77	.86	.....	.....	1.05	.69	1.02	1.02	.....	.97	1.02	.97	.....
28–28.9	.84	.81	.79	.88	*$0.72	*$0.67	1.07	.71	1.04	1.04	.....	.99	1.04	.99	*$0.86
29–29.9	.87	.83	.81	.90	.74	.69	1.09	.73	1.06	1.06	.....	1.01	1.06	1.01	.88
30–30.9	.90	.85	.83	.92	.76	.71	1.11	.75	1.08	1.08	.....	1.03	1.08	1.03	.90
31–31.9	.92	.87	.85	.94	.78	.73	1.13	.77	1.10	1.10	*$0.87	1.05	1.10	1.05	.92
32–32.9	.94	.89	.87	.96	.80	.75	1.15	.79	1.12	1.12	.89	1.07	1.12	1.07	.94
33–33.9	.96	.91	.89	.98	.82	.77	1.17	.81	1.14	1.14	.91	1.09	1.14	1.09	.96
34–34.9	.98	.93	.91	1.00	.84	.79	1.19	.83	1.16	†1.16	.93	1.11	1.16	1.11	.98
35–35.9	1.00	.95	.93	1.02	.86	.81	1.21	.85	1.18	.....	.95	1.13	1.18	1.13	1.00
36–36.9	1.02	.97	.95	1.04	.88	.83	1.23	.87	1.20	.....	.97	1.15	1.20	1.15	1.02
37–37.9	1.04	.99	.97	1.06	.90	.85	1.25	.89	1.22	.....	.99	1.17	1.22	1.17	1.04
38–38.9	1.06	1.01	.99	1.08	.92	.87	1.27	.91	1.24	.....	1.01	1.19	1.24	1.19	1.06
39–39.9	1.08	1.03	1.01	1.10	.94	.89	1.29	.93	1.26	.....	1.03	1.21	1.26	1.21	1.08
40 and above	1.10	1.05	1.03	1.12	.96	.91	1.31	.95	1.28	.....	1.05	1.23	1.28	1.23	1.10

*Minimum price and applies also to purchases of lower gravity.

†Maximum price and applies also to purchases of higher gravity.

[1] Tomball, Raccoon Bend (Deep Sand) and Satsuma.

[2] Includes Goose Creek, Sugarland, West Columbia, Thompsons, Mykawa, Amelia, Webster, and Clear Lake fields.

[3] Includes Berwick Bay, Bay St. Elaine, Caillou Island, Dog Lake, Four Isle, Gillis, Horseshoe Bayou, Iberia, Jefferson Island, Lake Barre, Lake Pelto, Leesville and Port Barre fields.

[4] Anahuac, Dickinson, Gillock, Cedar Point, Fairbanks, Turtle Bay, Hull, Liberty, Orange, Pierce Junction, Barbers Hill and Raccoon Bend (shallow sand) fields.

[5] Includes Saxet, Greta, O'Connor-McFadden, Taft, Plymouth and Tom O'Connor fields.

[6] Includes Duval, Jim Hogg, Jim Wells, Webb and Zapata counties, Texas, and Heyser and Placedo fields.

[7] Oklahoma Pipe Line (Carter Oil) and Magnolia schedules.

[8] Includes La Barge, Midway Dome, Dutton Creek.

Mid-Continent Flat Prices

	Flat Price	Date Posted
Arkansas:		
Smackover	$0.73	10-12-38
Louisiana:		
Garden Island	1.24	10-12-38
Gibson	1.04	10-11-38
Lafitte	1.04	10-12-38
Texas:		
East Texas	1.10	10-12-38
Talco	.55	10-12-38
Livingston, Cleveland	1.10	10-12-38
Van	.93	10-12-38
Pettus	1.29	10-12-38
Pecos County	.78	10-12-38
Pecos Shallow	.65	10-12-38
Luling	.87	10-12-38
Lytton Springs	.99	10-12-38
Salt Flat, Darst Creek, Hilbig, Carroll, Clark and Zoboroski	.96	10-11-38
Flour Bluff	1.27	10-11-38
Seabreeze, Willow Slough, La Belle, Hardin	1.00	10-13-38
Clay Creek	.85	10-13-38
Conroe	1.27	10-11-38
Cayuga	.81	10-19-38
Long Lake	1.08	10-19-38

Middle West Prices

Lima, Ohio	$0.90	10-13-38
Illinois	1.05	10-13-38
Illinois Basin	1.15	10-13-38
Centralia, Illinois	1.15	10-13-38
Princeton, Indiana	1.05	10-13-38
Western Kentucky	1.10	10-13-38
Kentucky River, Eastern Kentucky	1.20	10- -38
Big Sandy River, Eastern Kentucky	1.12	10- -38

Michigan Prices

	Flat Price	Date Posted
Porter, Greendale, Crystal	$0.92½	10-13-38
Buckeye, Bentley, Edenville and Beaverton	.90	10-13-38
Freeman; Bloomingdale	.82	10-13-38
West Branch-Arenac-Ogemaw	.70	12-19-38

Rocky Mountain States Prices

Colorado:		
Cannon City, Ft. Collins, Wellington, Moffat and Florence	.90	10-11-38
Iles, Light	.98	10-11-38
Iles, Heavy	.92	10-11-38
Montana:		
Cat Creek—Cut Bank	1.10	10-11-38
Sunburst	.90	11-16-37
Dry Creek	.92	10-11-38
New Mexico:		
Artesia	.77	10-11-38
Hogback	1.00	10-11-38
Wyoming:		
Big Muddy	.98	10-11-38
Byron	.55	10-11-38
Elk Basin	.90	10-11-38
Frannie, Light	.55	10-11-38
Frannie, Heavy	.42	10-11-38
Garland	.50	10-11-38
Grass Creek, Light	.90	10-11-38
Grass Creek, Heavy	.40	10-11-38
Hamilton Dome	.35	10-11-38
Lance Creek	.77	10-11-38
Mill Creek	.72	10-11-38
Oregon Basin	.50	10-11-38
Osage	1.30	10-11-38
Poison Spider	.59	10-11-38
Rock Creek	1.00	10-11-38
Tensleep	.646	10-11-38

Pennsylvania Prices

	Flat Price	Date Posted
Bradford-Allegheny	$1.88	2- 2-39
National Transit Lines	1.88	2- 2-39
Sw. Pa. Pipe Line	1.53	2- 2-39
Eureka Pipe Line	1.47	2- 2-39
Buckeye Pipe Line	1.45	2- 2-39
Corning Grade, Ohio	1.02	1-24-39

Major Price Changes

	Penna. (Nat. Tr.)	Mid-Cont. (36 Gr.)	Calif. (26 Gr.)
June 19, 1933	Up 10	Up 19	.....
June 26, 1933	Up 10	.....	Up 9-12
July 6, 1933	Up 13	Up 10	.....
July 17, 1933	Up 15	.....	.....
July 28, 1933	Up 15	.....	.....
Aug. 11, 1933	Up 10	.....	.....
Aug. 24, 1933	.....	Up 10	.....
Aug. 30, 1933	Up 15	.....	.....
Sept. 6, 1933	Up 10	Up 10	Up 15
Sept. 8, 1933	.....	Up 15	.....
May 1 ,1934	Up 10	.....	.....
Nov. 6, 1934	Cut 25	.....	.....
Dec. 6, 1934	Cut 25	.....	.....
Jan. 4, 1935	Up 15	.....	.....
Feb. 4, 1935	Up 15	.....	.....
May 16, 1935	Cut 15	.....	.....
June 26, 1935	Cut 15	.....	.....
July 16, 1935	Cut 10	.....	.....
Aug. 29, 1935	.....	.....	Cut *1
Sept. 6, 1935	Up 5	.....	.....
Oct. 29, 1935	Up 15	.....	.....
Nov. 1, 1935	.....	.....	Up *28
Nov. 18, 1935	Up 15	.....	.....
Dec. 6, 1935	.....	.....	Up *9
Jan. 9, 1936	.....	Up 10	.....
Jan. 13, 1936	Up 15	.....	.....
Feb 26, 1936	.....	.....	Up †5
Dec. 28, 1936	Up 12	.....	.....
Jan. 28, 1937	.....	Up 12	.....
Feb. 24, 1937	Up 10	.....	.....
June 7, 1937	Up 15	.....	.....
Sept. 1, 1937	Cut 22	.....	.....
Oct. 12, 1937	Cut 25	.....	.....
Dec. 1, 1937	Cut 15	.....	.....
March 7, 1938	Cut 17	.....	.....
June 13, 1938	Cut 25	.....	.....
Sept. 1, 1938	Cut 12	.....	.....
Oct. 11, 1938	.....	Cut 20	.....
Jan. 21, 1939	Up 12	.....	.....
Feb. 2, 1939	Up 8	.....	.....

* Signal Hill 26 gravity.
† Seal Beach 26 gravity.

Crude Production Taxes

Oklahoma—Five percent of gross value less royalty interests.
Texas—2¾ cents or 2¾ percent, whichever is higher.
Louisiana—From four to 11 cents a barrel, depending upon gravity.
Arkansas—2.6 percent of gross market values.
Montana—Two percent of gross value at well and 3/8 of 1c per barrel.
New Mexico—Severance tax of 2 percent on oil and gas.
Wyoming and New Mexico—Production tax based upon state and county assessments.
California—.66443 mills per barrel of oil produced and 17.39 cents an acre on proved lands.

down ⅛ to ¼ cent a gallon in some instances.

Natural gasoline was in fair demand, and some sales were made in the Mid-Continent at 2⅝ cents a gallon, which was ⅛ cent more than the top price of the previous week.

Kerosene prices were generally unchanged and steady, and some interest was shown in tractor fuels.

Fuel oil prices were mostly unchanged, although some of the lighter oils were marked down ⅛ cent by some sellers.

U. S. motor gasoline ranged in the Oklahoma market last week about as follows: 62 octane and below, 3⅝ to 4¼ cents a gallon; 63 to 66 octane, 3⅞ to 4¼ cents; 67 to 69 octane 4⅛ to 4⅝ cents; 70 to 72 octane 4⅜ to 5 cents.

Corresponding prices in the Chicago market were 3¼ to 4 cents, 3⅝ to 4 cents, 3¾ to 4¼ cents and 4 to 4⅝ cents.

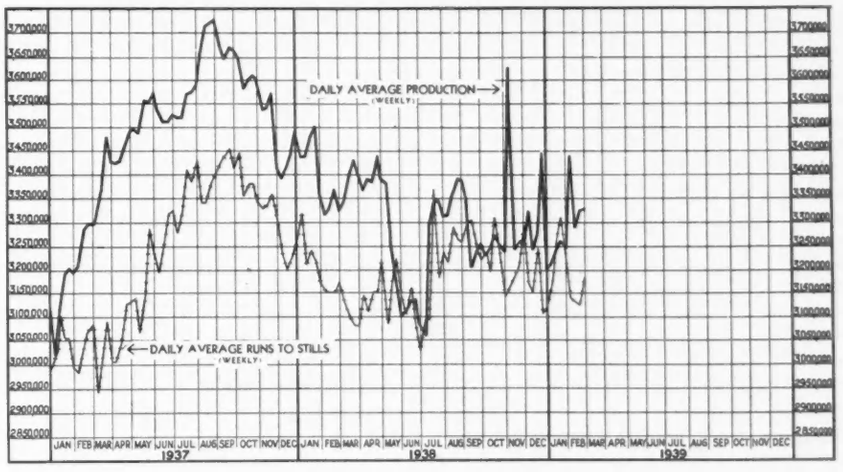
In East Texas, 60-62, 400 end point gasoline was priced generally at 4 cents a gallon.

Natural gasoline, grade 26-70, was priced generally in the Mid-Continent markets, f.o.b. refineries at 2½ to 2⅝ cents a gallon, and sales were reported at 2⅜ cents f.o.b. Breckenridge, Texas.

Kerosene prices f.o.b. Oklahoma refineries ranged from 3⅞ to 4¼ cents a gallon for the 41-43 water white grade, and from 4 to 4⅝ cents for the 42-44 water white grade; and corresponding prices in the Chicago market were 3½ to 4⅛ cents and 3⅝ to 4⅜ cents.

Fuel oil prices were down ⅛ cent a gallon in a few instances last week. In the Chicago market range oil was priced from 3⅜ to 4 cents a gallon. The No. 1 white oil was priced from 3⅜ to 3⅞ cents, and No. 1 straw from 3⅜ to 3⅝ cents. No. 2 straw was 3¼ to 3½ cents. No. 3 oil was 3 to 3⅜ cents. No. 5 oils were 57½ to 65 cents a barrel. The No. 6 oil was quoted at 35 to 45 cents.

United States Crude Oil Production and Refinery Runs



Better market provided for crude oil at K-M-A

Pipe line proration in the K-M-A field, North Texas, was reduced to a nominal volume effective March 1 when the two largest purchasers obtained relief from pipe line congestion through the exchange of well connections that involves production in the Texas Panhandle and the East Texas field.

Sinclair Refining Company, pipe line division, which has been restricting its K-M-A crude runs to 65 percent of the allowable since October 1, 1938, because of pipe line congestion, resumed 100 percent runs last mid-week. The company was relieved of about 60 percent of its runs in diverting 81 deep wells and 2 shallow pumpers, representing 2000 barrels of daily allowable, to The Texas Pipe Line Company in return for an equal volume of oil in the East Texas field.

The Texas Pipe Line Company was able to expand its demand for K-M-A

CALIFORNIA CRUDE OIL PRICES

(Posted February 26, 1936; except El Segundo and Wilmington, posted October 15, 1937, and Greeley and Canal posted July, 1938). All gravity above those quoted take highest prices of that field.

Gravity	El Segundo and Signal Hill	Seal Beach Alamitos Heights	Huntington Beach	Inglewood	Playa Del Rey	Olinda Brea Canyon	Athens Rosecrans	Torrance	Richfield	Whittier East Coyote La Habra	Montebello	West Coyote Hills	Santa Fe Springs	New Hall McKittrick Kern River Round Mountain	Greeley, Canal	Mountain View	Midway-Sunset Buena Vista Hills Elk Hills	Lost Hills	Coalinga	Wheeler Ridge	Wilmington
14–14.9	$0.80	$0.79	$0.78	$0.79	$0.80	$0.76	.....	$0.80	$0.76	$0.76	$0.77	$0.78	.....	$0.70	....	....	$0.70	$0.70	$0.70	....	$0.75
15–15.9	.80	.79	.78	.79	.80	.76	.....	.80	.76	.76	.77	.78	.....	.70	....	....	.70	.70	.70	....	.75
16–16.9	.80	.79	.78	.79	.80	.76	.....	.80	.76	.76	.77	.78	.....	.70	....	....	.70	.70	.70	....	.75
17–17.9	.80	.79	.78	.81	.80	.76	.....	.80	.76	.76	.77	.78	.....	.70	....	....	.70	.70	.70	....	.77
18–18.9	.80	.79	.78	.84	.80	.78	.....	.82	.76	.76	.77	.78	.....	.70	....	....	.70	.70	.70	....	.79
19–19.9	.82	.79	.82	.87	.84	.81	.....	.85	.76	.78	.77	.78	.....	.70	....	$0.70	.74	.74	.71	$0.70	.82
20–20.9	.85	.79	.85	.90	.88	.84	.....	.88	.78	.82	.77	.80	.....	....	....	.70	.78	.78	.72	.70	.85
21–21.9	.88	.79	.89	.93	.93	.88	.....	.91	.80	.85	.77	.84	$0.78	....	....	.73	.82	.82	.74	.70	.88
22–22.9	.92	.82	.92	.96	.98	.92	.....	.93	.84	.89	.79	.88	.78	....	....	.77	.87	.86	.78	.72	.92
23–23.9	.95	.86	.96	.99	1.02	.96	$0.84	.96	.88	.93	.82	.92	.78	....	....	.80	.92	.90	.82	.76	.95
24–24.9	.99	.91	1.00	1.02	1.06	.99	.88	.99	.91	.96	.85	.96	.82	....	....	.84	.97	.94	.86	.79	.99
25–25.9	1.03	.95	1.03	1.05	1.11	1.03	.93	1.02	.95	...	.89	.99	.86	....	....	.88	1.01	.98	.90	.83	1.03
26–26.9	1.06	1.00	1.07	1.09	1.16	1.06	.98	1.05	.98	...	.92	1.03	.90	Elwood	....	.91	1.06	1.02	....	....	1.06
27–27.9	1.10	1.05	1.11	1.12	.....	1.10	1.03	....	1.02	...	.96	1.06	.95	Terrace	$0.91	.95	1.10	1.06	....	....	1.10
28–28.9	1.14	1.10	1.14	1.15	.....	1.14	1.07	....	1.06	...	.99	1.10	.99	.94	.99	1.15	1.10	....	....	1.14
29–29.9	1.17	1.15	1.18	1.18	F.O.B.	1.17	1.12	....	1.09	...	1.03	1.14	1.03	....	.98	1.02	1.20	1.14	....	....	1.17
30–30.9	1.21	1.19	1.22	1.21	Pipe	1 21	1.17	....	....	...	1.07	1.17	1.08	F.O.B.	1.02	1.06	1.25	1.18	....	....	1.21
31–31.9	.....	.....	.....	1.24	Line	1.24	1.22				1.11	1.21	1.12	Ship	1.06	1.09	1.29	....	....	....	....
32–32.9	.....	.....	.....	1.27	.....	1.27	1.27	Kettleman Hills			1.14	1.25	1.16	....	1.09	1.13	1.34	....	....	....	....
33–33.9	.....	.....	.....	....	.....	.....	1.32	1.19			1.18	1.28	1.20	1.28	1.13	1.17	1.38	....	....	....	....
34–34.9	.....	.....	.....	....	.....	.....	1.37	....	1.23	...	1.22	1.32	1.25	1.32	1.17	1.20	.....	....	....	....	....
35–35.9	.....	.....	.....	....	.....	.....	1.42	....	1.27	...	1.25	....	1.29	1.35	1.20	....	.....	....	....	....	....
36–36.9	.....	.....	.....	....	.....	.....	1.46	....	1.31	...	1.29	....	1.33	1.39	1.24	....	.....	....	....	....	....
37–37.9	.....	.....	.....	....	.....	.....	1.51	....	1.35	...	1.32	....	1.37	1.43	1.28	....	.....	....	....	....	....
38–38.9	.....	.....	.....	....	.....	.....	1.56	....	1.39	...	1.36	....	1.42	....	1.31	....	.....	....	....	....	....
39–39.9	.....	.....	.....	....	.....	.....	1.61	....	1.43	...	1.40	....	.....	....	1.35	....	.....	....	....	....	....
40–40.9	.....	.....	.....	....	.....	.....	1.66	....	....	...	1.43	....	.....	....	1.39	....	.....	....	....	....	....
41–41.9	.....	.....	.....	....	.....	.....	.....	....	....	...	....	....	.....	....	1.43	....	.....	....	....	....	....
42–42.9	.....	.....	.....	....	.....	.....	.....	....	....	...	....	....	.....	....	1.46	....	.....	....	....	....	....
43–43.9	.....	.....	.....	....	.....	.....	.....	....	....	...	....	....	.....	....	1.50	....	.....	....	....	....	....
44–44.9	.....	.....	.....	....	.....	.....	.....	....	....	...	....	....	.....	....	1.54	....	.....	....	....	....	....
45–45.9	.....	.....	.....	....	.....	.....	.....	....	....	...	....	....	.....	....	1.57	....	.....	....	....	....	....
46–46.9	.....	.....	.....	....	.....	.....	.....	....	....	...	....	....	.....	....	1.61	....	.....	....	....	....	....
47–47.9	.....	.....	.....	....	.....	.....	.....	....	....	...	....	....	.....	....	1.65	....	.....	....	....	....	....
48–48.9	.....	.....	.....	....	.....	.....	.....	....	....	...	....	....	.....	....	1.68	....	.....	....	....	....	....

production through the Phillips Petroleum Company having relieved it of 4000 barrels of Panhandle production, which has been routed through the trunk line that also serves North Texas fields.

Negotiations are pending for the complete removal of pipe line proration at K-M-A by relieving the Continental Oil Company of its surplus well connections.

National cuts Oklahoma and Kansas crude

National Refining Company March 10 will adopt a schedule for crude oil in Oklahoma and Kansas based on price of 70-72 octane gasoline. The plan outlined to producers in shallow fields around Coffeyville, Kansas, provides for taking low average price of this grade gasoline for a month, multiplying by 18½ to determine price of 36 gravity crude oil. At current price of gasoline the reduction in crude oil price will be 22 cents a barrel.

The concern buys 6300 barrels daily in fields of southeast Kansas and northeast Oklahoma.

Illinois company buying right-of-way for line

Illina Company, of Decatur, Illinois, last week filed more than 100 pipe line right-of-way permits with the recorder of deeds of Madison County, Illinois, in preparation for construction of a 300-mile pipe line from southern Illinois to Chicago.

Crude Production

Decrease of 13,405 barrels brings United States daily average for last week to 3,315,250 barrels

Production of crude oil in the United States for the week ended March 4 was 3,315,250 barrels daily. At this level it was 13,405 barrels per day less than for the preceding week. With the exception of Oklahoma, Kansas and the Mountain States all areas over-ran the Bureau of Mines estimate of demand for domestic crude oil, and as a whole exceeded the recommendation by 95,250 barrels daily. Texas, Louisiana, and the Eastern States were the exceptions to the general decline.

Production in Texas averaged 1,324,550 barrels, 14,240 barrels daily more than for the preceding week, and 27,050 barrels more than the bureau allocation, but 63,780 barrels less than the state allowable.

Louisiana gained 1025 barrels over the preceding week in producing 267,275 barrels. Production exceeded state allocation by 12,135 barrels daily and bureau recommendations by 20,475 barrels.

California production fell to 608,400 barrels daily, 15,000 barrels less than production for the preceding week but still 3400 barrels daily greater than the state allowable and 28,400 barrels greater than the Bureau of Mines estimate.

Oklahoma registered an 8655-barrel daily decrease in falling to 441,200 barrels daily, where it was 13,200 barrels higher than the state allowable but 41,300 barrels daily less than the bureau figures.

Kansas declined 5800 barrels daily from the preceding week to average 144,900 barrels per day where production was 9000 barrels less than daily state allowable and 3700 barrels less than the bureau allocation.

40-gravity crude assessed at $380.00 per barrel

Oil and gas assessors of Kansas oil-producing counties, meeting in Wichita last week, set an assessment figure of $380 per barrel of 40 degrees gravity or higher on crude for this year. This compares with a $400 per barrel figure used last year. A reduction of $10 per barrel will be made for each degree under 40.

United States Crude Oil Production

Estimates Compiled by The OIL WEEKLY

DISTRICT OR STATE	Bureau of Mines Recommendation (Daily in Feb.)	State Allowable in Feb.	BARRELS DAILY FOR WEEK ENDED Mar. 4	Feb. 25
TEXAS—				
Texas Panhandle			63,100	61,800
North Texas			79,900	80,100
West Central Texas			30,150	30,800
West Texas			207,500	207,200
East Central Texas			94,000	92,400
East Texas Field			383,500	374,100
South Texas			252,400	248,300
Texas Gulf Coast			214,000	215,600
Total Texas	1,297,500	1,388,330†	1,324,550	1,310,300
CALIFORNIA—				
Long Beach			49,200	50,400
Santa Fe Springs			28,700	28,600
Huntington Beach			25,500	28,000
Dominguez			21,800	20,600
Ventura Avenue			34,700	33,100
Midway-Sunset			50,900	59,600
Kettleman Hills			54,600	63,500
Wilmington			84,100	84,000
Others			258,900	257,600
Total California	580,000	605,000*	608,400	625,400
OKLAHOMA—				
Oklahoma City			110,350	114,950
Seminole Area			96,825	98,650
Fitts			30,525	30,575
Others			203,500	206,580
Total Oklahoma	482,500	428,000	441,200	449,855
LOUISIANA—				
North Louisiana			72,125	71,050
South Louisiana			195,150	195,200
Total Louisiana	246,800	255,140	267,275	266,250

DISTRICT OR STATE	Bureau of Mines Recommendation (Daily in Feb.)	State Allowable in Feb.	BARRELS DAILY FOR WEEK ENDED Mar. 4	Feb. 25
KANSAS—				
Burrton-Haven			8,650	8,700
Russell County			21,000	22,255
Silica			8,550	8,200
Others			106,700	111,545
Total Kansas	148,600	153,900	144,900	150,700
NEW MEXICO	99,600	102,600	102,200	102,300
MICHIGAN	47,200		54,000	54,100
ARKANSAS	48,200		52,675	53,400
MOUNTAIN STATES—				
Wyoming	57,100		52,100	52,300
Montana	12,100		12,700	12,800
Colorado	3,600		4,100	4,050
Total Mountain States	72,800		68,900	69,150
EASTERN STATES—				
Pennsylvania Grade			70,200	67,500
Southern Illinois (New Pools)			144,800	144,200
Illinois-Indiana (Old Pools)			7,350	7,300
Others, Eastern			28,800	28,200
Total Eastern States	196,800		251,150	247,200
Total United States	3,220,000		3,315,250	3,328,655

* Recommendation of Central Committee of California Oil Producers.

† Daily average, considering Saturday and Sunday shut-downs.

WEEK'S DRILLING HIGHLIGHTS

Illinois

Additional impetus was given a wild leasing orgy when a Gallatin County wildcat, 30 miles from production cored three saturated McClosky sections, 36 feet of Waltersburg saturation, and 11 feet of Rosiclare saturation. Enterprise, Wayne County, was extended northwest and south. Avena Townsite pool was expanded a half mile west.

Kansas

Russell County got a new Dodge City lime pool near Coralena East, which produces from Kansas City-Lansing lime. Barton County got a new gas pool near Prusa oil field and indicated an extension for Lanterman. Extension well of Morel, Graham County, earned a potential rating of 1043 barrels.

Mountain States

Leo sand production at Lance Creek, Wyoming, was extended by a well which went on the pump after explosive and acid failed to make it flow. In Colorado, test of saturation is being made in a hole seeking oil below the gas at Hiawatha, Moffat County.

Southwest Texas

Vicksburg sand production was found on the east flank of Bentonville-King, Nueces County. A wildcat on La Gloria structure, Jim Wells County, is testing a 7100-foot sand. In the same county three new sands were found on the south end of East Alice and a wildcat east of the field is showing for a producer. West field, Jackson County, was extended, and a southwest outpost to La Rosa, Refugio County, is being completed as an extension. Discovery of Frio sand oil on the down-throw side of Samfordyce fault, Hidalgo County, presages more drilling there. McMullen County possibly will get a new field—a Mirando sand wildcat prepares to retest.

New Mexico

Interest was revived in the southeast sector of the Monument pool by completion of a well flowing 15 barrels per hour naturally. General expansion of field work is in prospect for the state with a raise in per-well allowable, but it is possible that line capacity limitations may counteract liberality of the authorities in fixing the higher rate of production.

South Louisiana

Listed recently as potentially the first field opener for St. Bernard Parish, continued drilling in the wildcat developed additional oil sands this week. One of the best wells yet completed in the field contributed a new sand to Bay St. Elaine, Terrebonne Parish. Off the shore of Cameron Parish a new sand was found in Creole field. Villa Platte, Evangeline Parish, chalked up its second producer, while the second well at Horseshoe Bayou, St. Mary Parish, is preparing to test a new sand. Big Lake's new sand at 7843 feet yielded 13 barrels of oil. Abandonments below 11,000 feet are becoming common in the district.

Texas Gulf Coast

Previously regarded as a failure at contract depth, a well extended Satsuma, Harris County, northwest. Fairbanks, same county, also has an extension looming. A potential discovery well at Echo, Orange County, was abandoned after fluid flow failed to turn to oil.

Arkansas

Two locations for wildcats were announced during the week in the continuation of search for Permian-lime production.

North Louisiana

Test is being made of a showing of 42-gravity oil from Paluxy in a wildcat on the southeast flank of the Sabine Uplift in Natchitoches Parish. The third commercial Tokio well at Vivian has not counteracted the attitude toward this area as not being up to expectations aroused by the original discovery.

East Texas

Buffalo gas field was extended northwest by a well making more distillate with the gas than is usual in the district. Another well is being completed at Navarro Crossing, and more work is in prospect in the east end at Talco following completion of a good well there.

Comparison of Permits Granted for New Wells

STATE	Week Ending Mar. 4	Total this Mo.	Total this Year	Total this Date Last Year	1938 Year Total
Arkansas	7	7	38	43	247
California	16	16	175	230	1,146
Louisiana	10	10	204	249	1,214
Kansas	15	15	212	313	1,453
Michigan	21	21	167	100	953
Oklahoma	49	49	344	373	1,978
Texas	193	193	1,749	2,571	12,369
Total	311	311	2,889	3,879	19,360

Summary of Wells Completed in the United States Week Ending March 4, 1939

	Completions	Oil Wells	Gas Wells	Failures	Initial Production	Total 1939	Total this Date 1938
Alabama	....	....	....	....	....	1	....
Arkansas	6	4	....	2	1,680	51	39
California	20	19	....	1	10,669	181	207
Colorado	2	....	....	2	.....	4	3
Florida	....	....	....	....	.....	....	....
Illinois	49	36	....	13	10,373	722	137
Indiana	....	....	....	....	.....	23	14
Kansas	24	19	....	5	19,154	226	369
Kentucky	12	6	3	3	640	131	130
Louisiana	23	11	....	12	2,029	168	210
Michigan	27	19	1	7	12,574	205	155
Mississippi	....	....	....	....	.....	1	5
Montana	....	....	....	....	.....	20	7
Nebraska	....	....	....	....	.....	....	....
New Mexico	10	8	....	2	4,500	118	94
New York	6*	6*	....	....	21	89*	143*
Ohio	12	1	6	5	10	157	187
Oklahoma	28	20	1	7	19,674	328	396
Pennsylvania	16*	15*	1	....	19	216*	456*
Texas	151	121	1	29	97,773	1,788	2,370
Utah	....	....	....	....	.....	....	....
West Virginia	15	1	10	4	5	92	177
Wyoming	4	2	....	2	648	36	13
Total this week	405	288	23	92	179,769	4,557	5,112
Total last week	431	294	25	112	227,704	4,152	4,538
Total this year	4,557	3,124	323	1,110	.....	.....	.....

* Includes water-input wells.

Oklahoma Fields

Success attending attempts to extend old fields.

Proven areas of St. Louis and Searight enlarged.

Tulsa.—Continued success in extending old pools, chiefly those of the Greater Seminole area, is keeping the list of drilling wells in Oklahoma well up to the figure calculated earlier to give the state between 1500 and 2000 completions in 1939.

Latest extension in the area came last week with a small flowing well in Cromwell sand a mile northeast of Searight, discovered in 1926. Production in the field is chiefly from the Hunton lime and the Wilcox sand. The well a mile northeast found water in the Wilcox and then found the Hunton lime dry. Perforations in the Cromwell sand resulted in flowing production estimated at 50 barrels daily.

St. Louis, Pottawatomie County, which still leads the state in wells drilling, got another eastward extension last week. The extension for the Grayson field, Seminole County, was put under 10-acre spacing restrictions last week.

OKLAHOMA
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Creek—		
Indo, Stanley 1, c sw sw se 33-18n-10e	60	2630
Swift, Hayden et al 2, ne se ne 12-19n-9e	*	1165
Lincoln—		
Cooper, School Land 6, nec 16-14n-6e	300	3114
Wilcox O&G, Sac-Fox 24, se nw nw 22-14n-6e	39	3091
School Land 1, se sw ne 16-14n-6e	275	3111
Logan—		
Bland, Miller 1, nec se 4-17n-4w	Abn.	lcn.
Muskogee—		
Heydrick, Anthis 1, sw sw nw ne 21-13n-19e	¶1	740
Howard et al, Jefferson 1-A, sw swc nw 33-15n-15e	40	1349
Noble—		
Phillips et al, Hacket 6, se ne se 21-23n-2w	2880	4323
Okfuskee—		
Shell, Gahagen 2, se ne nw 11-11n-8e	86	3387
Vincent et al, Fields 1, se se sw nw 2-11n-11e (pb 2800 ft)	*	2905
Pawnee—		
Thomas, Ackley 2, sec 14-20n-9e	37	1264
Ackley 3, sw se se 14-20n-9e	5	1265
Ackley 4, 80 ft s cwl se sw se 14-20n-9e	*	1285
Sinclair Prairie, Burger "B" 11, n½ s½ ne se 17-21n-8e (otd 1784 ft)	*	1800
Payne—		
Mid-Continent et al, Ramsey 8, ne nw nw 18-18n-2e	10,135	4793
Stanolind, Walters 1, swc ne 18-18n-2e	3240	4848
Pontotoc—		
Delaney, Killcrease 2, sw se nw 7-4n-8e	*	2047
Pottawatomie—		
Atlantic Refg., Spaugy 1, sw se nw 6-6n-4e (pb 4440 ft)	143	4487
Magnolia, Fyke "B" 3, sw ne nw se 20-7n-5e	*	3525
Helmerich et al, Billington 1, sec sw 31-7n-5e (otd 4177 ft)	436	4204
Alma, Rhodd "A" 2, sw nw se 32-7n-5e	150	4192
Hall et al, Smith 3, nec 32-7n-5e (Correction for Newstadt, Bruno 2)	318	4090
Newstadt, Bruno 2, sec 31-7n-5e (otd 4047 ft)	312	4120
Alma, Canfield 1, nw ne sw 33-7n-5e (otd 4252 ft)	350	4257
Curley 2, se sw nw 33-7n-5e (otd 4185 ft)	750	4208
Seminole—		
Superior, King 1, ne nw ne 13-6n-5e	53	3827
Weldon 1, nec 13-6n-5e	65	3838
Francis O&G, Harris 3, se nw nw 4-6n-6e	*	2900

* Failures; † Junked; ¶ Million cu. ft. gas.

Drilling Increasing

Drilling also is continuing to increase for the Sac & Fox pool, Lincoln County, where flowing wells are being completed in the Prue sand between 2800 and 2900 feet.

Most of the wildcat drilling in Oklahoma is confined to the western half of the state.

The Oklahoma Corporation Commission last week approved a 10-acre spacing program for the north extension of the Grayson pool, Seminole County, one of the active smaller areas of the state. The territory includes Sections 11, 12, 13 and 14 of Township 6 north and Range 6 east, the SW Section 7, and the NW Section 18, both in Township 6 north, Range 6 east. The area had one completion last week by Sunray Oil Company, whose Fleet 1, NE SE SW 12-6n-5e, made 180 barrels from the Earlsboro sand at 2845 feet. There are six wells drilling.

The north offset to the discovery well of the Hillsdale field, Garfield County, is being plugged back after drilling into the Wilcox and Arbuckle lime without favorable results, hence Champlin Refining Company's Boehm 2, NE SE NW, will test upper formations. A southeast offset is producing from the Wilcox formation from which the discovery is making oil and water.

The old Searight area, Seminole County, came back to give a good account of Cromwell sand testing last week. After drilling to the Wilcox sand, H. S. Moss, plugged back and perforated pipe in Leachman 1, C N½ SE NE 34-10n-6e, to get a small flowing well from 4264 feet. The well is a mile northeast of the Searight pool. Wilcox showed water.

An old field, now under active development and being enlarged to the east is the Sac & Fox pool, eastern Lincoln County, where flowing wells are being completed in Prue sand between 2800 and 2900 feet. The field has 10 wells drilling. Three were completed last week.

The only drilling well in the deep area between the shallow production of the Fox and Milroy pools, Carter County, Gulf Oil Corporation's Empire 1, C SE SE 27-2s-3w, treated the oolitic lime with 10,000 gallons of acid at 8110 feet without success, and continues drilling. Indications are that completion of this well will be the end of the drilling play that promised to uncover substantial deep production following the discovery in 1935.

Last week brought another eastward production for St. Louis. Eagle Oil Company shut down with lease tanks filled after 22 hours of swabbing in Green 1, C W½ W½ SE 29-7n-5e. It is producing from the Wilcox sand between 4040 and 4093 feet. The new development east of the old field plus the plugging back that is being done within the field gives St. Louis first rank in Oklahoma field activity.

In the wildcat list the Washita County deep test of Continental Oil Company, Procter 1, C NW 28-10-20w, after having spent more than two months in under reaming the hole to land 9-inch casing at 10,195 feet, the longest string of casing of that size ever set in Oklahoma, is waiting on cement to set. Although the depth is impressive in feet, bottom of the hole is only in early Pennsylvania beds, a shallow depth from a geological consideration.

Oil firm accused in NLRB complaint

Crown Central Petroleum Corporation was charged with unfair labor practices by the International Union of Oil Workers before the National Labor Relations Board in Fort Worth, Texas, last week. Union officials accused the company of maintaining and dominating a company union.

The complaint arises from recent picketing imposed on Crown Central's Houston plant, which I.U.O.W. members surrounded to prevent trans-shipment of oil from the strike-bound Tulsa plant of Mid-Continent Petroleum Company. The company, claiming itself bound by contract to handle the oil, was also beset by striking seamen from tankers docked at the plant.

The union contends that in the last week the company has "sponsored the formation of a company union."

Leasing trend indicates tests for Missouri soon

St. Joseph, Missouri.—Transfer of blocks in the Missouri part of the Forrest City basin give indication that the area will see drilling wells with the change in weather conditions. Meanwhile the leasing play is moving into Iowa.

To date, however, Missouri has its one derrick standing as the only physical evidence of actual testing. This derrick was erected last October by H. V. Elwell on the Taylor farm, C EL NW 12-62-w1w, east of Milan, Sullivan County. An interest in this test and the drilling of another on a block assembled by Elwell is to be taken by North Missouri Oil Development Company, in which stock is being sold in St. Joseph.

Latest location to be mentioned is by W. E. Mills and associates, who propose a test SW SE 30-62-38w, north of Mound City, Hole County. Mills has a contract to drill to the St. Peter formation unless oil is found at a shallower level. The block was assembled by J. H. Everett. The test will drill with rotary tools.

Another test still without definite location is to be drilled by W. D. Turner of Houston in Andrews County, northeast of here.

Rotary rig is being moved into Macon County, northeast of Bucklin, where C. E. Richardson has announced location for Jones 1, C NW NW 16-58-17w. This rig is due to be moved to

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the location as soon as weather and road conditions permit.

The leasing play over the whole area shows no abatement, despite the fact that geological opinion is not wholly encouraging. The presence of fresh water exists in the sands and supplies water for cities and towns in Iowa.

Pure selling North Oklahoma system

The Pure Transportation Company pipe line, division of Pure Oil Company, is selling part of its gathering system in Eastern Muskogee County to J. A. Coy and Charles Skolnik, Tulsa. The new owners contemplate supplying King Refining Company, Incorporated, of Tulsa, operating a refinery at Muskogee through the present and possibly enlarged facility. The take-over involves approximately 30 miles of lines serving 90-odd leases in 14n and 15n and 15e, 16e and 17e.

Completions running ahead of new starts in Kansas

Wichita.—Wells completed ran ahead of wells started in Kansas last week, 24 against 15. The 24 completions included 19 producing wells, with initial rating of 19,154 barrels, and 5 dry holes. By counties the wells started were divided as follows: Barton, 6; Cowley, 1; Greenwood, 2; Kingman, McPherson and Rice, 1 each; Stafford, 3.

KANSAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Barton—		
Shell, Hoffman "C" 6, nw se se 1-16s-14w	365	3351
Spencer et al, Patzner "A" 5, swc se 36-17s-11w	1862	3254
Champlin, Grant 1, nw sw nw 20-20s-11w	*	3340
Cowley—		
Shawver, West Newton 4, nw se nw 15-30s-4e	5	2775
Davidson et al, Meyers 1, nwc se 29-30s-5e	*	2293
Cities Service, Elrod 1, c ne ne 4-32s-5e (otd 2424 ft)	*	3163
McKnab, Byers Land 3, nec nw 21-32s-5e	442	3082
Ellis—		
Darby, Henderson 1, sec nw 7-11s-17w (otd 3436½ ft)	3015	3452
Ellsworth—		
Continental, Stienberg 3, nwc 27-17s-8w	1692	3246
Cities Service, Rolfs 4, se sw ne 14-17s-9w (pb 3080 ft)	36	3177
Rolfs 11, nw sw ne 14-17s-9w (pb 3088 ft)	90	3202
Greenwood—		
Rhodes et al, Long 3, sw se sw ne 17-23s-13e	20	1755
Dunkin, Sauder 1, cwl ne sw nw 20-23s-13e	*	1772
Kingman—		
Garden, Joel 1, swc 11-27s-10w	*	3576
McPherson—		
Phillips, Anderson 3, swc nw 30-19s-1w (pb 2960 ft)	32	3415
Lebow, Decker 3, nw ne se 36-19s-2w (pb 2992 ft)	5	3414
Reno—		
Olson, Duckworth 5, ne nw ne 23-23s-4w (pb 3375 ft)	23	4000
Russell—		
Skelly, Opdyke 5, sec sw 29-14s-13w	1766	2907
Stearns et al, Olson 1A, ne nw nw 27-14s-14w	2992	3009
Stanolind, Roesner 2, swc 9-15s-13w	265	3133
Stafford—		
E. H. Moore, Johnson 2, se nw ne 13-24s-11w	4728	3787
Stanolind, Hartnett 6, se ne nw 13-24s-11w	264	3783
Hartnett 7, csl sw ne nw 13-24s-11w	1449	3771
Sumner—		
Wentworth, Lotta 3, nec se 8-30s-2w	103	3227

* Failures; † Junked; ¶ Million cu. ft. gas.

Kansas Field Developments

Most drilling being restricted to proven areas. Well near Coralena East indicates new oil field.

Wichita.—Further evidence that drilling in Kansas is being restricted to proven areas came last week with completion of 19 producing wells out of 24 completions. Barton, Ellsworth, Russell and Stafford counties are drawing most of the locations and furnishing most of the producing wells from week to week.

The only well to give indications of a new pool last week was a potential rating of 603 barrels from Dodge City lime. The well is a half mile northwest of the Coralena East pool, which produces from the Lansing-Kansas City lime. This lime series was dry in the well in question and it was plugged back to the upper lime. Erratic action of the Dodge City lime as a producing formation in Western Kansas is a factor in any consideration of the well.

There were extensions for the Pursa field, Barton County, and the Lanterman field, same county. Further testing will prevent completion of the mile extension indicated two weeks ago for the Leesburgh field, Stafford County.

Republic Natural Gas Company last week bought 160 acres and one producing well in the Trapp pool, Russell County, from Albert M. Austin, Wichita. The leases are in W½ SW E½ NW Section 23-15-14w.

Development of the week to gain the rating of a new pool was in Russell County, where R. H. Shields got Dodge City lime production in Gross 1, C SL SE NE 5-15-13w, after plugging back from the Lansing-Kansas City lime. The well is a half mile northwest of the Coralena East pool, which produces from the Lansing-Kansas City lime. It made potential of 603 barrels. The formation, however, is one that has given but little production in Western Kansas.

New Gas Pool Indicated

A gas pool from Lansing-Kansas City lime was indicated for Barton County, where Sinclair Prairie Oil Company made perforations between 3076 and 3117 feet in Oser 1, SEc SW 17-16-11w, to get an output estimated at 50,000,000 cubic feet. The well is a half mile northeast of Prusa oil field, which produces from the Arbuckle lime. An extension to the northeast for the Prusa field was indicated by a showing from the Arbuckle lime between 3279 and 3300 feet. Here Sinclair Prairie Oil Company decided to set pipe and test Laudwick 1, NWc 21-16-11w, after oil began to show in the last few feet of drilling.

The south extension for the Leesburgh pool, Stafford County, will not be determined until experimental drilling to test the water level is finished. Here Continental Oil Company found top of the Arbuckle lime at 4024 feet in Russell 1, C SW NE 13-26-13w, and drilled to 4041 feet after setting pipe. Oil rose 3950 feet in the hole within 45 minutes without acid treatment. Action of the well left encouragement that flowing production could be established by acid treatment. The hole is being drilled deeper to establish the level of water and completion will follow this test. The well is a mile south of the discovery well.

Lanterman Extension Indicated

An extension for the Lanterman pool, Barton County, was indicated when oil rose 1200 feet in the hole in Birzer 1, NEc SW 21-19-11w, from 3154 feet in the Lansing-Kansas City lime. The well is a mile southwest of Lanterman production. It will be tested for production from the present depth. The well was drilled by I. W. Murfin and associates.

Another test by Murfin, a half mile northwest of the Bredfeldt pool, Rice County, was making gas from 3140 feet in the Lansing-Kansas City lime. It is Habiger 1, SWc 6-18-9w. A little oil was showing with the estimated 2,000,000 cubic feet of gas.

Potential rating of 1043 barrels was given the extension well for the Morel pool, Graham County, a half mile northwest of production. Continental Oil Company found the Arbuckle lime saturated two weeks ago in Drumm 1, SEc NE 16-9-21w, two weeks earlier, but the potential test was delayed. The well was drilled to 3702 feet in Arbuckle lime.

Midway between the Cramm and Cramm North fields, Rice County, McPherson Drilling Company's Cramm 1, SE NW 15-19-9w, has set casing at 3203 feet to test saturation in Arbuckle lime cored from 3204 to 3207 feet. The well is a half mile from each field.

Deep Rock reorganization held up by court ruling

Reorganization of Deep Rock Oil Corporation, Tulsa, was halted by decision of the United States Supreme Court February 27, which reversed previous rulings of the trial court at Tulsa and affirmation by the Tenth Circuit Court of Appeals. The supreme court ruling was to the effect that the provision in the reorganization by which Standard Gas & Electric Company would get $5,000,000, which the opinion classed as "at the expense of preferred shareholders."

Independent Association to meet in Fort Worth

Fort Worth, where the first general meeting of the Independent Petroleum Association of America was held, will be the site of the Tenth Anniversary Annual Convention, next October 18, 19 and 20, it has been announced by C. E. Buchner, executive manager, Tulsa.

The association's organization meeting was held in Colorado Springs, June 11, 1929, and the first convention was in Fort Worth the following April.

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Illinois Devolopments

Gallatin County wildcat cores McClosky saturation. Enterprise pool is extended northwest and south.

Olney, Ill.—Coates & Fields' Green 1, SW SW SW 16-9s-9e, Gold Hill Township, Gallatin County, had casing set at 2600 feet and was preparing to drill in late last week after coring three sections of McClosky lime saturation, one of 7 feet, the second of 15 feet and the third of 8 feet. The 15-foot stretch was described as having good saturation with fair porosity, sufficient to make a well without acidization.

Besides the McClosky saturation, the wildcat cored 36 feet of Waltersburg sand saturation below 1750 feet, (a formation thus far unproductive in Illinois, but yielding paying production in adjoining Indiana), and 11 feet of Rosiclare, topped at 2535 feet. Just north of Junction, the wildcat is 30 miles from production in an area that has been experiencing one of the wildest leasing campaigns of the current Illinois development since rumors of Rosiclare and Waltersburg saturation were circulated several weeks ago.

Operators have staked the Stinson 1, in the SW SE SW 9-9s-9e, a McClosky test, and will drill a Waltersburg sand test in Section 21-9s-9e. Material was being moved in for the first test. The wildcat topped the Glendean at 1930 feet, the Golconda at 2070 feet, Cypress at 2200 feet, Weiler at 2215 feet, Paint Creek at 2275 feet, Bethel at 2352 feet, Renard at 2390 feet, Aux Vases at 2405 feet, St. Genevieve at 2448 feet, Rosiclare at 2535 feet, Fredonia at 2570 feet, and McClosky at 2637 feet.

ILLINOIS
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Brown County—		
Ripley Oil Trust, P. Reich 1	*	642
Clay County—		
Pure, Bunn 4B	262	3073
Kingwood Oil Co., Elliott 2	91	2997
Schafly & Dameron, Nash 2	125	2952
Clinton County—		
Adams O&G Co., Copple 8	38	1357
Copple 9	35	1367
Coles County—		
East Oakland Synd., Temple 1	*	1400
Fayette County—		
Union Prod. Co., Mahon 1	*	1827
Sherman et al, Garver 1	100	1608
Sefton 3	150	1503
Sefton 4	200	1569
Texas Co., Griffith 1	168	1608
E. Maxwell 1	63	1635
Wagner 1	50	1632
Zephyr Dr. Co., Garver 1	25	1615
Glasco & Lewis, Wagner 1	24	1629
Reink et al, Rummill 1	*	1900
Mudge Oil Co., Devore 3	50	1496
Carter, Durbin 3	440	1584
Durbin 4	240	1587
McClain 1	249	1573
McClain 2	204	1547
McClain 3	348	1578
Jefferson County—		
Magnolia, Rutkowski 1	208	2273
Oslager 1	294	2269
Pyramid Pet. Corp., Troutt 1	*	2595
McDonough County—		
H. O. Hammer, Jones 1	*	920
Marion County—		
Hensky et al, Yoos 1	*	1170
Broddus et al, Whitechurch 1	*	1912
H. B. Lee, City of Centralia 1	330	1877
Frontier Oil Co., Antioch School 1	1600	1984
Hollingsworth, Kalkbrenner 4	1650	1995
Kalkbrenner 5	315	1785
Kalkbrenner 6	425	1775
Robert Bros., Pittenger 4	400	2030
Pittenger 5	175	1805
Pittenger 6	175	1810
Texas Co., City of Centralia 10	420	1974
E. Jett 9	150	1851
Oil Royalties, Ltd., Suggs-Meaker 1	*	1745
Kingwood & Bell, J. O. Shanafelt 1C	891	2101
Magnolia, Chitwood 12	96	1855
W. O. Chitwood 21	244	2081
Richland County—		
Texas Co., W. Elliott 2	69	3008
Wabash County—		
Taylor Dr. Co., Schafer 1	*	2348
Wayne County—		
Thompson Dr. Co., Briscoe 1	*	2260
Pure, Hasselton 1A	*	3166
W. S. Lawrence 1A	69	4328
H. S. Weinert, Ferguson 1	*	3270

* Failures; † Junked; ‡ Million cu. ft. gas.

Double Extension

Extensions to the new Enterprise pool of Elm River Township, Wayne County, opened recently by Whitcher's Fitch 1, were registered in two directions last week, and initial production of the completed wells indicated that eventual drying of roads and fields will place this area in the forefront of Illinois development activity. Pure Oil Company's F. Behymer A-1, C W SE NE 4-1n-8e, started flowing a little short of 50 barrels an hour after acid treatment. Bottom is in the McClosky lime at 3125 feet. The test is 1 mile northwest of the pool opener. An offset was announced—Lucy Hubble 1, C W NE SE 4-1n-8e—to the south. Over ½ mile south of the pool opener, Manahan & Muhlbach's E. Fitch 1, Section 10-1n-8e, started flowing 50 barrels an hour natural from McClosky lime between 3085 and 3099 feet. West offset to the field opener, Manahan, Muhlbach & Gordon's Elston & Dora Fitch 1, Section 3-1n-8e, was preparing to drill plug to 14 feet of McClosky saturation. Bottom was at 3089 feet.

Pure Oil Company announced the Butt Consolidated 1, CS½ NE NE Section 10-1n-8e, and the Ruel E. Fitch 1, CE½ SW NE Section 10-1n-8e, both offsets to the E. Fitch 1, and the Fitch-Powell 1, CE½ SW SW Section 3-1n-8e, offsetting the Elston & Dora Fitch 1.

Focal points of attention in Lake Centralia-Salem pool were W. S. Tatum's English 7, SW 8-1n-2e, and Kingwood Oil Company and Gulf Refining Company's Burge 1, NE NE SE 18-1n-2e, both Devonian tests. Tatum's test has been making slow progress, with an apparent spongy lime at 2700 feet responsible for loss of drilling fluid. Oats, sawdust and mud have been dumped into the hole in an effort to regain circulation. Some improvement was noted, with indications that the trouble would be remedied. The Burge 1 was fast approaching the English 7 depth, drilling at 2550 feet at last report. It is one-eighth mile south of production in the pool.

In Washington County, Pres Cochran and G. H. Blankenship's Oak Grove Cemetery 1, SE SE SW 15-3s-3w, 1¼ miles southwest of the discovery in the Cordes pool, was running 78 feet higher than the pool opener—Blankenship's J. L. Dennis 1, NE SW NE 4-3s-3w, Pilot Knob Township. Five and one-half inch was run to 1000 feet to shut off water in the tar springs, and preparations were being made to drill into the Stein sand.

Longhorn Oil Company's Mrs. J. M. Helm 1, SW SW NW 15-3s-14w, Compton Township, Wabash County, resumed drilling after an enforced shutdown caused by an over-flowing Wabash River, and recovered a good Benoist sand saturation between 2731 and 2748 feet. Four miles west of the Cooper pool opener in Gibson County, Indiana, the wildcat was again threatened when melting snow and rains brought the river to the slush pit. It is an intended McClosky test.

Southern Richland County's first wildcat, Leathers et al's A. Yonaka 1, NW SE SW 22-2n-14w, Bonpas Township, was idle because of inability to move in supplies. The test recovered a Cypress sand show and was to continue to the McClosky. Bottom was at 2750 feet.

Avena Extended

In Eastern Fayette County, Rush & Rosenthal's Mollie Rush 1, in the Avena Townsite, was completed as a 200-barrel well in the Weiler sand, extending the pool ½ mile west. The area had been condemned by a dry hole drilled last summer. On other lots of the Avena Townsite, these operators were drilling the Kepner 1, while T. W. Lee's Harner 1 had casing set to an excellent saturation. Holding practically all the acreage surrounding the townsite, Shell Petroleum Corporation will be forced to drill offsets.

Palaciene Oil Company was reported preparing to abandon Inland Steel Co. 1, C SE NE 29-4s-2e, Jefferson County, at 3165 feet.

In White County, Jimmie Leggett, drilling contractor, was moving in materials for the A. C. Thomas Matilda Hon 1, NW SE 32-3s-11e, Phillips Township, south of Grayville. Interested in the wildcat, besides Thomas, are Gene Shirley and Judge Blodgett Priest. In the same township, J. W. Pearson's Boultinghouse 1, SW 10-4s-14w, had derrick up. T. C. Chisum is the drilling contractor.

Oil Well Drilling Company's H. V. Shahan 1, SEc SW 9-5n-5e, is a new Clay County wildcat location.

Nomenclature committee names eight new pools

Mattoon, Ill.—Eoght recently opened Illinois pools have been given names by the nomenclature committee meeting here recently: They are:

Barnhill—the area opened by Robinson et al's Felix 1, Section 27-2s-8e, Wayne County, sometimes referred to as Merriam or South Fairfield.

Boyleston—the area opened by Roche & Voyles' McPherson 1, Section 4-2s-7e, Wayne County, originally called Fairfield.

Cordes—the area opened by Blankenship's Dennis, Section 4-3s-3w, Washington County, formerly called the Nashville pool.

Enterprise—the area opened by Whitcher's Fitch 1, Section 3-1n-8e, Wayne County, sometimes called the Fitch pool

Marcoe—the area opened by Magnolia Petroleum Company's Dare 1, Section 22-3s-2e, Jefferson County.

Mattoon—the area opened by Wheeles et al's Michael, Section 1-11n-7e, Paradise

Township, Coles County, first called the Michael pool.

Mt. Erie—the area opened by Muhlbach's Anderson 1, Section 2-1s-8e, Wayne County, first termed the Anderson pool.

South Olney—the area opened by Frost's Farris 1, Section 18-3n-10e, Richland County.

The area opened by Thompson's Waddell 1, Section 29-3n-7e, Clay County, has been added to the East Flora pool, while the area opened by Bruner's Kuyoth 1, Section 30-2n-8e, Wayne County, has been added to the Clay City pool.

New outlet planned for Birck City field

Aetna Oil Company will begin construction as soon as conditions permit of a 10-mile four-inch crude oil pipe line from Birk City to the Ohio River, announced W. R. Abbot, president. The line will run on the Daviess side of the Green River to the Ohio, where the crude will be stored in tanks for shipment about twice a week on two recently-completed 9000-barrel oil barges.

PENNSYLVANIA
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Bradford District—		
Hardwick, Rice & Tuohy, Fisher...	1	....
Oil City Trust Co., No. 152, fee.....	5	....
N. V. V. Franchot, Mgr. Trustee, Warters	2	....
Forest Oil Corp.....	1	....
Niagara Oil Corp.....	1	....
Bradford Transit Co., 7 wells.....	7	....
Bradford: Water Intake Well—		
Niagara Oil Corp.....	...	....
Butler-Armstrong District—		
Yaste, McKnight, et al., H. Reiber.	1	....
Middle District—		
National Petroleum Co., Stanton...	1	....
New York-Pennsylvania: Gas Field—		
G. L. Cabot, Inc., C. Crane No. 2...	gas	....
Potter County—		
Penn York Dev. Co., Barnes 2....¶4.00		4950
Washington County—		
Beedle, De Bone et al, J. McNary 1 ¶.10		2756

* Failures; † Junked; ¶ Million cu. ft. gas.

NEW YORK
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Steuben County—		
G. L. Cabot, Holting 2.....¶1.62		3937
Allegany County—		
R. B. Moore et al, Curtiss farm, Bolivar	5	1390
Curtiss farm, Bolivar.....	6	1380
Bradley Prod. Corp., Star farm, Bolivar	5	1425
Star farm, Bolivar.....	5	1439
Allegany: Water (Pressure) Wells		
Trio Oil Co., Davitt farm, Bolivar ..		1359
Forest Oil Co., Ackerman farm, Bolivar	..	1440

* Failures; † Junked; ¶ Million cu. ft. gas.

OHIO
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Ashland County—		
Ohio F. G. Co., Mauer 1.....	*	3070
Athens County—		
Gross, McCune et al, Sapp 5.....	*	470
Fairfield County—		
City Nat. Gas Works, Shonebarger 2	¶.10	2070
Hocking County—		
Griffin Prod. Co., Nutter 1.....	¶.85	2920
Knox County—		
C. A. Davis, Martin 1.....	¶.37	2111
Lawrence County—		
Wiser Oil Co., Watson 1.....	*	2877
Noble County—		
Jewell, Muskingum Conservatory 1	¶	1401
H. B. Walker et al, Wilson 1.....	¶	1723
Washington County—		
J. F. Graham, Mendenhall 1.....	*	1965
Bowman O. & G. Co., Jarvis 1....	*	1110
Ohio F. G. Co., Walsh 5.....	¶.16	1779
Wayne County—		
McCrea, Wohlgamuth 2.....	10	2940

* Failures; † Junked; ¶ Million cu. ft. gas.

Kentucky Fields

Wildcat near Owensboro cores McClosky; is delayed. Gilmore outpost pumps 150 barrels in 18 hours.

Owensboro, Ky.—Mocarz Oil Company's Loren Whitely 1, 3½ miles southeast of here and in Daviess County, cored one foot of McClosky lime at 1635 feet, but a breakdown in machinery delayed completion. There was a showing of oil and gas in the small amount of lime cored.

In eastern Henderson County, Sun Oil Company and Kentucky Natural Gas Company's E. Allgood 1, east outpost of the Gilmore pool, produced 150 barrels on the pump during an 18-hour test. Fordsville Gathering Line Company was laying a line to the well.

After encountering a show of oil and a gas pocket at 4300 feet, Gulf Refining Company's Schmetzer 1, deep wildcat south of Madisonville, was drilling ahead at 4600 feet. It is in the Devonian.

Magnolia Petroleum Company's J. E. Casey 1, deep test near Spottsville, Henderson County, encountered the Devonian at 3995 feet and was drilling on at 4005 feet. It is the first test in this county to enter the Devonian.

In Ohio County, W. E. Neal et al's Mrs. J. C. Nabors 1, adjoining the Dundee pool, recovered 11½ feet of good Jett sand saturation below 503 feet and was to be completed in that formation with a total depth of 516½ feet.

Carter Oil Company was preparing to move in materials for a test in the vicinity of Sun Oil Company and Kentucky Natural Gas Company's G. Trigg 2, wildcat which opened a new McClosky pool in the Corydon Section of Henderson County a week ago. The pool opener flowed 250 barrels during a 20-hour period last week, filling all available tankage.

An increase from 50 to 75 percent in the allowables of wells in the Owensboro field was announced for March 2 by Producers Pipe Line Company and Illinois Pipe Line Company. Proration was set at 50 percent several weeks ago, partially because of market conditions but mostly because of difficulty in moving crude with high water. Operations in northwestern Kentucky have been carried on at a severe handicap during recent weeks because of the flood stage of the Green and Ohio Rivers. Recession of water from roads and farms in the Owensboro section is expected to result in a material increase in work.

KENTUCKY
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Daviess County—		
Mecca Oil Co., Johnson 10.....	100	1900
Gardner & Hanson, Jones 4.....	5	1605
Major Oil Co., Long 2.....	75	1912
Wahl 4	200	1900
Floyd County—		
Warfield Nat. Gas Co., Wells 4819	¶.60	3227
Hancock County—		
Henry & Ross, Boling 3.....	*	948
Henderson County—		
Grubbs et al, Cooksey 1.....	100	2240
Sun and Kentucky Nat. Gas Co., Trigg 2	160	2605
Ohio County—		
H. M. Hunt et al, Howard 1.....	*	930
Pike County—		
Columbian Fuel Co., Tierney Land Co. G. W. 830.....¶1.21		1806
A. Johns 1	*	....
Mountaineer O&G Co., Allen 1....	¶.24	3600

* Failures; † Junked; ¶ Million cu. ft. gas.

Gibson discovery offset flows 45 barrels hour

Evansville, Ind.—Hollingsworth & Bander Drilling Company's David M. Cooper Estate 1, NE 13-3s-14w, Wabash Township, 240 feet south of the Gibson County pool opener completed late last year, produced 45 barrels an hour from the McClosky lime on a 12-hour test through a 2-inch choke. Bottom is at 2885 feet.

Slush, rain and mud have combined to make almost impossible drilling conditions in this section of the Illinois basin and delayed confirmation of the first Indiana McClosky pool during the current development campaign. While other tests are drilling under difficulties in the region, it will be another two or three months before development may be carried on in Southern Indiana at the rate promised by recent leasing activity.

Hollingsworth & Bander Drilling Company set surface casing at 125 feet at David M. Cooper Estate 2, NE SW 13-3s-14w, a direct east offset to last week's completion.

Ray J. Ryan's Wm. & Brizella Dunn 1, NE SE SE 18-3s-13w, Wabash Township, 1½ miles southeast of the Cooper Estate well, was closely watched last week as it neared the McClosky depth. Bottom was at 2635 feet at last report.

WEST VIRGINIA
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Cabell County—		
Montaineer Gas Co., Nelson 2.... ¶.11		3835
Gilmer County—		
Pittsburgh & W. Virginia Gas Co., Lyons 7654	¶.09	1772
Kanawha County—		
South Penn Oil Co., Monk 1 .....¶2.70		5128
G. L. Cabot, Putnam Co. 1.....¶4.02		5021
Lewis County—		
Pittsburgh & W. Va. Gas Co., Brannon 7650	*	2726
Pleasants County—		
Dinsmoor & Co., Eddy 1.....	¶.20	2080
Riggs et al, Simonton 3.....	¶.40	1823
Ritchie County—		
Moore Farm Oil Co., W. F. Moore 1	¶.35	2059
Davis & Deem, Foster 2.....	*	1900
Moats & Barker, Fowler 1.....	5	990
Hays, Wilson 5	¶.09	2030
Tyler County—		
White, Johnson 1	*	....
Wayne County—		
United F. G. Co., Fry 4284.....	¶.19	3321
Wetzel County—		
Hughes et al, Wade & Cannon 1..	¶.20	543
J. D. Smith et al, Montgomery 1..	*	3030

* Failures; † Junked; ¶ Million cu. ft. gas.

West Texas Fields

Wasson and Bennett areas to get busy when line provided.

Jones County wildcat swabbing to test slight show of oil.

Midland, Texas.—The failure of West Texas to yield a wildcat producer during the first two months of the current year has left the district void of any important lease play. There are no immediate prospects of a discovery materializing from the wildcats now drilling. Pending tests are comparatively few in number since the companies that normally support wildcatting are well fortified with undrilled proven locations that have accumulated over a period of years, else accrued last year when a record number of extensions were given established oil areas. The district lacked a single new discovery in 1938 that qualified as a potential major source of production.

Expansion of the Yoakum County sector of the Wasson field to the east occurred when Sinclair Prairie Oil Company's Kendrick 1, ¼-mile from production, flowed 210 barrels natural by heads from broken pay at 5001-5152 feet. A small amount of water was reported, but has exhausted. The well is due to be acidized. Texas Pacific Coal & Oil Company's Brownfield 1, 1½ miles northeast of production in the east portion of the field is changing to cable tools at 5020 feet after cementing pipe at 4587 feet. Early exploration of the untested acreage situated along the 3½-mile interval that separates Brownfield 1 from the Bennett field is due to follow shortly. Coline Oil Company is credited with having farmed out three quarters section tracts that carry drilling obligations.

The Wasson and Bennett areas will become the most active drilling centers in the district as soon as the pending pipe line outlets become available. The single pipe line that serves these and other areas in the North Basin region has banned new-well connections since January 20 due to a capacity load. Some relief will be available late this month when Aloco Oil Company begins diverting the output of about 30 controlled wells to a storage tank that is being erected in PSL Section 381, Block AX, Gaines County. Gathering lines are being installed in the Wasson field to connect with the tank before a 6-inch carrier is built to Hobbs.

Shell Petroleum Corporation's Waples Platter 1, situated 3 miles northeast of the Bennett field, was drilling at 4910 feet, having logged top of the Brown lime at 4340 feet. The Texas Company is reported to be contemplating a wildcat in northeastern Yoakum County in connection with the recent purchase of a checkerboard spread of 1600 acres at a price range of from $6 to $10 per acre. The lease lies to the northeast, southwest and northwest of Section 207, Block D.

Hockley County was assigned two new tests by The Texas Company, including Mallet 1-C, northeast corner of Labor 11, League 51, Scurry County School Lands, a wildcat in the southwest portion of the county. The company has derrick up for Slaughter 5, west offset to the most northwesterly producer in the Slaughter field.

M. C. Lindsay and others are negotiating for the drilling of a wildcat in western Dawson County on a block that centers upon NE E.L. Ry. Section 95, Block M. It is southeast of the Clear Lake geophysical prospect in northeastern Gaines County.

The five-mile stretch of sparsely explored area added by the extension of the original Church & Field field, Crane County, to the northwest was credited with several small wells in process of completion and a probable failure. Phillips Petroleum Company's University 1, SW NW SW Section 9 and 1980 feet north of the first completion in the extension sector, encountered sulphur water at 3401-3403 feet. A small show of oil was logged at 3228 feet. Magnolia Petroleum Company's University 1-18, NW SW SE Section 18, situated 1¾ miles west and south of production recorded a trace of oil at 3194 feet, and was drilling soft brown lime at 3292 feet. It is structurally high but lacks adequate porosity to make a well.

Contractor's heavy rotary rig was being set up last week for the drilling of a previously announced Ordovician lime project for the Masterson pool, Pecos County. Anderson-Prichard Oil Corporation arranged for a deep test last fall on the J. S. Masterson land, center of south quarter of the north quarter H&GN Section 104, Block 10.

WEST TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Andrews County (Emma)—		
Anderson-Prichard, Cowden 3	1141	4253
Sinclair Prairie, Cowden 4	877	4214
Andrews County (Fuhrman)—		
Barnsdall, Ford 7	767	4458
Skelly, Ford 2	1211	4452
Crockett County (Crockett)—		
Gilcrease Oil Co., University-Humble 4-16	82	1424
Crane County (Sand Hills)—		
Humble, J. B. Tubb 24	2336	4430
Ector County (Foster)—		
Broderick & Calvert, Johnson 3-A	1224	4280
Ector County (Goldsmith)—		
Gulf, Goldsmith 157	94	4201
Goldsmith 161	2020	4206
Goldsmith 162	900	4175
Goldsmith 164	912	4195
Landreth Prod. Corp., Scharbauer 5-O	612	4205
Phillips-Pure, C. Cowden 55	1770	4156
Ector County (Jordan)—		
Gulf, W. E. Connell 16-B	888	3660
Ector County (North Cowden)—		
Sinclair Prairie, Corrigan 3	1692	4356
Texon O&L Co.-Group 1 Oil Corp., Roberts 5	2975	4380
El Paso County (Wildcat)—		
Tri-State Oil Co., Kinkel 1	*	3571
Howard County—		
Magnolia, Chalk-Peerless 2	1448	2780
Shell, Snyder 2-A	613	2858
Jones County—		
Danciger, Roberts 5	328	1918
Sandy Ridge Oil Corp., Steffens 5-a	256	1893
Nolan County (Wildcat)—		
Union Oil Co., J. D. Pepper 1	*	6011
Pecos County (Masterson)—		
Sahara Oil Co.-R. G. Patillo, Shearer-Atlantic 2	33	1491
Pecos County (Pecos Valley)—		
Union O&M Co., Scharff-Blackman 3	95	1775
Pecos County (Shearer)—		
Street et al, Shearer-Texas Co. 6	31	1473
Upton County (McCamey)—		
Humble, Ricker 29-B	227	2418
Rife et al (was Hancock-Knox), Baker-Republic 5	1140	2262
Ward County—		
Ja-Chel Oil Co., Buckners Orphans Home 1	187	2080
Magnolia, Geo. Sealy 16-46	252	2825
Sahara Oil Corp., Dorr-Atlantic 4	146	2083
T. P. Coal & Oil Co., H. James 28	63	2405
Western Well Service Corp., Johnson 1	139	2081
Winkler County (Kermit)—		
Magnolia, Walton 216	401	3258
Yoakum County (Bennett)—		
T. P. Coal & Oil Co., Bennett 18	1204	5260
Yoakum County (Wasson)—		
Humble, Wooten 6	1246	5090

* Failures; † Junked; ¶ Million cu. ft. gas.

Jones County wildcat making swabbing test

Abilene, Texas.—The west central Jones County wildcat prospect of Ralph R. Carroll et al on the Herndon tract, Block 3, Goliad County School Land Survey No. 359, was making swabbing test late last week after using 3000 gallons of acid in Noodle Creek lime at 2651-77 feet. The well showed very little oil when swabbed down before acidizing. It is 5 miles southwest of the Chittenden pool. The Texas Company's W. E. Camp 4, offsetting flowing wells in the lower lime pay in the Noodle Creek field, developed 2900 feet of oil in hole from the second horizon at 3135-40 feet. It was originally completed at 2499 feet.

The completion of a second oil producer in the Avoca townsite sector of the Griffin pool, Jones County, was considered assured when W. H. Peckham et al's Humphrey 1, cored oil saturated lime at 3260-74 feet. A production test was due last week-end after cementing 5¾-inch pipe on top of the Palo Pinto lime.

W. I. Southern, Inc.'s Carlisle 2, located 1800 feet northwest of the discovery pumper from the Palo Pinto lime in the Carlisle pool, Stone Wall County, is awaiting production test at 5138 feet, with casing cemented on top of the Palo Pinto lime section. The original well was completed last August at 5172-76 feet by Stonewall Oil Company (A. G. Swanson and F. B. Parriott), and later sold to the above concern along with a portion of the lease block. Forest Development Corporation's Cauble-Boyd 1, near C NW NE H&TC Section 45, Block D, has cemented pipe and changed to cable tools after coring oil saturation at 4690-4712 feet, with an elevation of 1670 feet.

Rules for Goldsmith field are revised

Rules for the Goldsmith field, Ector County, have been revised by the Texas Railroad Commission to fix a basis for gas well allowables based on the allowance made to oil wells.

The new order provides that "gas wells in the Goldsmith pool be allowed to produce daily only that amount of gas which is the volumetric equivalent in reservoir displacement of the gas and oil produced from that oil well in this field which withdraws the maximum amount of gas in the production of its daily oil allowable. In converting

the daily oil allowable from such oil well to its volumetric gas equivalent in reservoir displacement the average reservoir pressure and average reservoir temperature of the Goldsmith field shall be used."

Texas drilling permits total 193 during week

The Texas Railroad Commission last week approved permits for drilling 193 new wells in Texas, 70 more than were allowed the week before.

For the second consecutive week, no permits were approved for wells in the East Texas field, although four locations were reported from the remainder of the East Central Texas area.

Operators in the Gulf Coast section were allowed 66 permits including 26 in San Patricio County, while Southwest Texas producers listed 29. In West Texas there were 28 locations approved, and from the West Central Texas District there were 18 permits reported.

The commission approved permits for drilling 19 new wells in North Texas, while operators in the Panhandle were allowed 29 with 13 in Hutchinson County.

NORTH TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Archer County—		
Burns et al, Andrews 2, blk 26....	20	920
Cree & Hoover, Turbeville 2.....	44	1502
Eichlor & Lanfair, Bell 1, sec 14..	7	1137
Bell 2, sec 14	*	1142
Golding & Cochran, Kunkel 6, blk 8	5	1148
Hutcheson et al, McCrory 7, sec 121	*	212
McCrory 8, sec 121	*	630
Shappell Oil Co., Bell 16, sec 27...	69	984
Westmount Oil Co., Dempsey 7, blk 10 (new pay)	17	4616
Archer County (Hull-Silk)—		
Bert Ligon-Deep Oil Dev. Co., Wilson-McCrory 1, sec 25.....	710	4298
Archer County (Jackson-Canyon)—		
Madden & Goldsmith, Hamilton 3, blk 22	22	2750
Archer County (Wildcat)—		
Bridwell Oil Co., Bridwell 2, sec 8	*	1877
Griffin et al, Wilson 1, sec 128....	*	4517
Baylor County (Wildcat)—		
Petroleum Prod. Co., Portwood 1-L, sec 1575	*	1500
Clay County—		
Bowers et al, Shumake 8, blk 4.....	242	1165
Duncan-Arnold et al, Duncan 7, blk 14	180	1193
Shaw Oil Co., Myers 1, blk 49.....	*	1360
Clay County (Wildcat)—		
Grace et al, Hunt 1, sec 135.....	*	1503
Cooke County (Wildcat)—		
Snuggs et al, Lewis-Texas Co. 1...	*	1821
Cooke County (Best)—		
Sinclair Prairie, Best 4.....1121		4977
Grayson County (Collinsville)—		
F-H-E Oil Co., Graham 1.....	*	3905
Jack County (Wildcat)—		
Compton et al, Wilson 1.....	18	386
Jack County—		
Sewell et al, Edwards 2.....	5	344
Montague County—		
Seitz-Comegys & Seitz, Roach 5-B..	120	2152
Yeargin et al, Bouldin-Crow 1.....	30	815
Throckmorton County (Wildcat)—		
Cheney et al, B. H. Richards 1, sec 2367	*	4680
Wichita County (Jackson-Canyon)—		
King Oil Co., Rathke 3, blk 20...	36	2636
Wichita County (K-M-A)—		
Board of Mineral Dev.-G. & W. Drl. Co., Big Wichita River 5.....	752	3728
Consolidated Oil Co., Ferguson 16..1470		3809
James 2, sec 16 1408		3989
E. C. Oil Co., Mangold 7, blk 32...	952	3835
Ven-Mex Oil Co., Griffin 3-A, lot 6.	800	3827
Wichita County—		
Burns et al, Mitchell 27, blk 7....	6	311
Mitchell 28, blk 7.....	5	307
Wilbarger County—		
Lawson Pet. Co., Waggoner Est. 1, sec 50	13	1300

* Failures; † Junked; ¶ Million cu. ft. gas.

North Texas Fields

Archer deep reverses shift interest to Clay and Jack.

Asylum discovery offset flows after multiple treatments.

Wichita Falls.—Deep drilling in Archer County contributed several disappointments the past week, while interest in the district has been shifted to Clay and Jack counties where prospective oil producers from the deep lime have stimulated lease trading.

Louis Sikes et al's Martin 1, SWc Wm. Shaw Survey, failed to produce in the Strawn series, and was drilling lime at 5705 feet with the Ellenberger as its next objective .This northeastern Archer County wildcat is 1¾ miles northeast of Sikes et al's lower Strawn discovery on the Ford land. Trend of production to the northwest of the Hull-Silk field was recently defined when Eph. Griffin et al's Wilson 1 failed to encounter saturation and was plugged at 4517 feet.

Griffin et al's Waggoner Estate 1, northwestern Archer County wildcat, logged dry lime in the upper Strawn at 4090-4150 feet, and is proceeding with the fulfillment of a 5250-foot drilling obligation. Bridwell Oil Company's Oil Investment Company 31-B, located 3½ miles west of the Chalk Hill deep lime area was abandoned at 4480 feet, the development of the Scotland deep area, eastern Archer County, uncovered last year by Adams Oil & Gas Company, is to result from the sale of the small pumper and controlling interest in the lease block by Christie Bros. and Deep Oil Development Company. The latter are to drill another test according to reports.

Tankage is being erected for an early production test of L. T. Burns et al's Browning 1, western Clay County wildcat reported last week as indicating a new Strawn pool. The well yielded 43-gravity oil when formation tester was applied to saturated lime at 4432-61 feet. Pipe has been cemented at 4433 feet. Lease and royalty trading has been active in the area. A tract situated less than a mile south of the well was leased with the stipulation that a test must be drilled if Browning 1 makes a commercial oil well.

Northwestern Jack County made its strongest bid for deep lime production when Piltzer-West et al's Fred Warren 1, near C NE Section 2784, TE&L Survey, flowed oil by heads after using 10,000 gallons of acid in lime at 4365-4417 feet. The test was drilled to 4480 feet. It is estimated at from 50 to 75 barrels daily. Oil and gas showing were logged by an old failure drilled a quarter-mile to the northeast by Cosden Oil Company.

British-American Oil Producing Company's Cope 1, located ¾-mile southwest of the company's Canyon lime oil discovery in eastern Baylor County was drilling below 3250 feet to fulfill a 5500-foot depth contract. This second well for the geophysical structure, did not test the Canyon, carrying nominal saturation at 2569-75 feet.

Petroleum Producers Company and Continental Oil Company's Finkler 1, south offset to their discovery producer for the Asylum pool, southeastern Wichita County, is flowing 17 barrels daily after multiple acid treatment in the Bend lime at 5089-5141 feet.

TEXAS PANHANDLE Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Carson County—		
Magnolia, Fee 50 (lease 244)	305	3065
Moore County—		
Texoma Nat'l Gas Co., Coon 12-M..¶20.4		3325
Wheeler County—		
Alma Oil Co., East Johnson 1....	427	2455
Smith Bros. Ref. Co., Harlan 12...	447	2525

* Failures; † Junked; ¶ Million cu. ft. gas.

East Texas Fields

More distillate in flow from Buffalo extension

Kilgore.—The productive limits of the Buffalo gas field, Leon County, were extended 6000 feet northwest when the Lone Star Gasoline Company's J. M. Duncan 1, J. M. Webb Survey, indicated an open flow rating of 100,000,000 feet daily, with 3 barrels of water-white distillate per 1,000,000 feet of gas, from casing perforations opposite the first sand at 5638-79 feet. The well gauged 8,100,000 feet daily on proration test through 9/16-inch choke. Top of the Woodbine series was called at 5604 feet, with an elevation of 339 feet, and was logged at 5728-79 feet. The distillate production

EAST TEXAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Joiner Area—		
Humble, Price 59 (432.05-ac) 5400		3730
Price 60 (432.05-ac) 5000		3733
Konowa Operating Co. (was Droppleman), F. J. Cox 10 (60-ac)..3000		3718
F. J. Cox 11 (60-ac) 3000		3720
Ray Est., Wilson 13 (50.8-ac) 8000		3610
Kilgore Area—		
Hardin et al, Peterson 4 (104-ac). 600		3602
Humble, S. S. Laird 43-A (230-ac).. 900		3722
S. S. Laird 96-B (568.53-ac).....2000		3620
S. S. Laird 98-B (568.53-ac).....2500		3625
Jenkins et al, King 4.....4000		3566
Shell, Russell 32 (126-ac) 7500		3794
Sun, Walker 4 (394.65-ac) 25		3691
Longview Area—		
Shell, Landers 28 (98.55-ac) 3800		3714
Titus County (Talco)—		
Humble, T. S. Temple 1, (50-ac).. 399		4332

* Failures; † Junked; ¶ Million cu. ft. gas.

accompanying the gas flow was greater than previous completions.

Another oil well for the south portion of the Navarro Crossing field, Houston County, was in process of completion late last week. Humble Oil & Refining Company's Tryon 1, east offset to production, was flowing 7½ barrels of oil and wash water hourly while cleaning itself through ⅛-inch choke. Oil sand was logged at 5874-80 feet, but 5½-inch pipe was cemented 3 feet off bottom to attain a low gas/oil ratio.

Resumption of explorations near the short-lived oil gusher at Kosse, Limestone County, will materialize shortly. Stanley A. Thompson et al awarded contract to the Bunn Drilling Company to drill a 4000-foot test on the Kaufman tract, J. D. Brown Survey. Location will be made about 4½ miles east by north of the Humphreys Interests' Jones 1, which blew in August 18, 1922, rated above 5000 barrels of pipe line oil daily at 3767 feet. The well was later junked, and numerous tests on nearby sites failed to produce.

More development is in store for the east end of the Talco fault line field, Titus County, as result of the completion of Humble Oil & Refining Company's Temple 1, which pumped 399 barrels of 18.6-gravity oil initial from Paluxy sandy-lime at 4322-32 feet, with an elevation of 337 feet. It is 3100 feet east of nearest production.

George Strake et al's Farrier 1 northwestern Wood County wildcat and the only active lower Trinity test in the north portion of the Woodbine belt, was drilling below 2100 feet, with an elevation of 397 feet. It is 4 miles east of Yantis.

Less Drilling in Big Field

The drilling of inside locations in the East Texas field has been curtailed 50 percent within the past month, and currently the volume of field work is at the lowest level attained since the record smashing development program was launched late in 1930. A survey of field activity accounts for a total of 21 operations, with only 13 rigs in service. Independents are credited with 6 drilling tests and a total of 11 operations, while Humble Oil & Refining Company, Shell Petroleum Corporation and Gulf Oil Corporation are the only active majors.

This unexpected slump in development is voluntary, for operators have scores of perimts to drill wells that are exceptions to the spacing rule. The curtailment is attributed to the possibility of a major change in the method of apportioning production allowable arising from the Rowan-Nichols Oil Company's Federal Court suit against the Texas Railroad Commission. Oral testimony was concluded February 10, and Judge R. J. McMillan granted attorneys in the case 22 days for the preparation and filing of briefs.

Veth hearing

A hearing has been scheduled by the Texas Railroad Commission for March 6 at Nocona to consider operating rules for a new field in Cooke County. The field is expected around the well completed by Whitfield, Pierson and Grimes on the Veth tract.

Southwest Texas Fields

Vicksburg oil found on east flank of Bentonville.

Three new sands logged on south side of East Alice.

Corpus Christi.—More new oil sands were opened in South Texas Gulf Coast oil fields during the week. One is an important Vicksburg discovery in Nueces County, while the other key discoveries enhance present multiple districts.

Southern Minerals Corporation's King 16, in the Bentonville-King district of Nueces County, flowed several barrels of oil and a slight amount of brackish water per hour through ¼-inch choke under pressures of 550 pounds on tubing and 1425 pounds on casing after casing was perforated at 6137½-41 feet. It had the Vicksburg sand at 6133-43 feet. Present production on the east flank of this field, where the new test is located, is at 4000 feet in the Frio.

Disappointments at Riverside

Riverside field, also Nueces County, and hot spot of interest, had several set backs, with Henshaw Brother's Contiss 1, west of the field, being abandoned at 5525 feet, and two other wells apparently failures but drilling ahead. HD & H, Inc.'s Wright 1, south offset to the discovery oil well, was drilling below 5650 feet. Heep Oil Corporation et al's Smith 1, was below 5950 feet. About 14,000 feet northeast of the field, Republic Natural Gas Company was commencing a test in San Patricio County.

Magnolia Petroleum Company's Sam Haun 1, southern Jim Wells County, expected to open production on the La Gloria structure, is preparing to test sand and shale section at 7092-7165 feet. It had been carried to 7545 feet, plugged back to 7170 feet, set 5-inch liner, and will gun perforate.

R. B. Bryant's Ingram 1, south end of the East Alice field, Jim Wells County, encountered sands at 3735-55 feet, 5045-65 feet, 5114-66 feet, 5269-90 feet, 5642-80 feet, and set casing on bottom at 5730 feet. Three of the sands are new for the area.

Gravis and Doran's Clark 1, on the east side of the East Alice field and also a possible discovery of a new producing area, is ready to drill plugs and perforate higher after flowing salt water through perforations at 4825-35 feet.

Howell et al's Wright 1, several miles north of Alice, tested salt water through perforations at 6644-48 feet and likely will be abandoned.

In Kenedy County, Humble Oil & Refining Company is drilling a well apparently intended to be a slim hole. It is this company's first well on the big King ranch deal and may be carried to extreme depth. A string of 8⅝-inch surface casing was landed at 1381 feet.

Salt water got two wildcats in the McCampbell sector of San Patricio County. Richardson Oil Corporation's Sherwood 1, 1 mile south of the field, drilled to 8310 feet, plugged back and tested salt water through perforations at 6858-68 feet. J. K. Culton's McCampbell 1, 3½ miles west of the field, tested 1700 feet of salt water at 6760-76 feet. and was drilling ahead.

West Field Extended

Magnolia Petroleum Company added another 1320 feet to the west side of the West field, Jackson County. Nannie West 8-A, cored oil sand 5115-33 feet, and flowed 198 barrels of pipe line oil per day through 3/16-inch choke under pressures of 400 pounds on tubing and 850 pounds on casing.

Morgan-Gulf Oil Corporation opened a new sand in the La Rosa field of Refugio County when Rooke 1, southwest outpost, cored sand at 5709-14 feet and recovered 1000 feet of 37-gravity crude on a drill-stem test. Casing was set and the well was being finished late in the week.

Medina County wildcat is running structurally high

San Antonio.—Gilcrease Oil Company's Lilly 1, wildcat in southeastern Medina County, was running several hundred feet higher than two tests drilled in the general area and was going ahead to the Edwards limestone. It now takes on the complexion of one of the most important operations in this sector of South Texas in months.

The well topped the Taylor marl at 1740 feet, Anacacho at 2340 feet. It was at 2544 feet, apparently in the Austin chalk, late in the week.

In Lee County, a pumping test was being made on Fred Pederson's Brown 1, two miles south of Tanglewood. The well had pumped a little oil and a large volume of salt water from the Edwards limestone at 6394-6404 feet. Deepened to 6424 feet, the oil volume apparently showed a minor increase and the test was to be continued.

Steve Panos' Sanders test, 12 miles west of McDade and in the same county, was at 4600 feet, likely in the Edwards, and was ready to test a reported oil show.

Retest of McMullen County well may open new field

Laredo.—Holbrook-O'Farrel Company et al's Miles 1, Poitevent Survey No. 143, in southwestern McMullen County, is drilling plugs to retest after squeeze job. First completion attempt failed when the cement gave away. The well is in Mirando sand at 968-75 feet and is showing for possible discovery of a new oil field.

Gravis and Doran's Parr 1, 6000 feet northeast of Sweden field in Duval County, drilled to 6272 feet, 10 feet in sand, where electric survey was run. The well was plugged back to recore the field sand at 5868-74 feet.

E. A. Thompson et al's Ramirez, south of the Lopeno field in Zapata County, failed to make a producer in the Mount Selman at 2331-43 feet, but will make further tests. It may be that the cement job prevented proper test of the sand.

Hitchcock hearing

An increase in the allowable for the Hitchcock field, Galveston County, will be considered at a hearing before the Texas Railroad Commission, scheduled for March 11 at Austin.

SOUTH TEXAS

Completions

SAN ANTONIO DISTRICT

Company, Well and Location	Init. Prod. Bbls.	Depth
Bexar County—		
Hierholzer, Gembler 1 (WC) Eckert area	*	820
Philtop, Patton 5 (Mission-Alta Vista)	*	1312
Wagner, Lamm 1 (WC) 10 mi se San Antonio	*	1002
Caldwell County—		
Coffield, Smith 2-A (Salt Flats)	76	2698
Smith 5-A (Salt Flats)	62	2707
Crouch, New 6 (Salt Flats)	76	2736
Martell, Gray 2-B (Salt Flats)	38	2680
Robinson & Coffield, Young 10 (Branyon)	38	2223
Young 11 (Branyon)	46	2217
Guadalupe County—		
Gulf, Tadlock 7 (Darst Creek)	705	2628
Weyel, Schraffl 1 (WC) 3 mi s New Berlin	*	756
Real County—		
Hart & Howell, Love 1 (WC) 43 mi w Kerrville	*	310
Willamson County—		
Fuchs, Schmidt 1 (WC) J. West survey	*	1400

CORPUS CHRISTI DISTRICT

Company, Well and Location	Init. Prod. Bbls.	Depth
Colorado County—		
Coyle-Concord, Powell 4-B (WC) Garwood area	205	6159
Jackson County—		
Magnolia Petroleum, West 8-A (West Ranch)	450	5133
Jim Wells County—		
Mosser, Fee 1 (WC) Alice area	*	6079
Nueces County—		
Henshaw, Countiss 1 (WC), Riverside area	*	5525
Killam, Chapman 1 (WC), 16 miles sw Corpus Christi	*	7012
Lockhart, Comstock 2 (Agua Dulce)	¶10 & 100	4914
Phillips, McKinzie 7 (Turkey Creek)	350	5879
Stanolind, Spessard 21 (Luby)	550	5059
Refugio County—		
Houston, Pratt-Hewitt-Rooke 60 (Refugio)	450	6214
San Patricio County—		
Abbott & Traxler, Community Lease 1 (McCampbell)	1300	7145
Grote & Corgey, McCampbell 3 (McCampbell)	1300	7160
Miller 2 (McCampbell)	1200	7143
Peterson & Dunn 1 (McCampbell)	1100	7141
Peterson-O'Brien-Scrivner 2 (McCampbell)	1250	7170
Houston, Baldwin 3 (E. White Point)	500	5681
Nash, Young & Henderson 2 (McCampbell)	1200	7137
Nueces, Harris 1 (McCampbell)	1100	7121
Plymouth, Cole 1-C (E. White Point)	500	5673
Victoria County—		
Barnsdall, McFaddin 19 (McFaddin)	350	4400

LAREDO DISTRICT

Company, Well and Location	Init. Prod. Bbls.	Depth
Duval County—		
Hamill & Smith, Perez 1 (WC), 12 mi se Realitos	*	3114
Humble, White B-11 (Lundell)	17	1679
Magnolia, Duval County Ranch 5 (63) (Casa Blanca)	*	1379
Porter, Driscoll 1-B (Fitzsimmons)	*	4591
Transwestern, Duval County Ranch 18 (294)	*	1247
McMullen County—		
Argo, Edrington A-2 (WC), Rhode Field	*	3009
Ezzell, Fee 30 (Ezzell)	152	1519
Starr County—		
D. D. Oil, Dallas Stock 1 (WC), Rincon area	*	5025
Zapata County—		
Nordan & Morris, Haynes 8-C (Comitas)	52	1257

* Failures; † Junked; ¶ Million cu. ft. gas.

Gets Frio production on down-throw at Samfordyce

Mission.—First Frio sand oil production on the down-throw side of the Samfordyce fault, Hidalgo County, was proved late March 2 with completion of Fohs Oil Company's Ed Sullivan 1, northeast outpost to the area. The well flowed 10 barrels per hour through 5/32-inch choke with 910 pounds tubing pressure and 1500 pounds casing pressure. Located 825 feet northeast of Phillips Petroleum Company's Jackson sand distillate producer, the well cored a gas sand at 3414-22 feet and an oil sand at 3422-36 feet. It is bottomed at 3465 feet, with casing landed on bottom and perforated at 3424-32 feet with 20 shots.

The new discovery is located 330 feet out of the northwest corner of a 65-acre lease in Share 254, Porcion 39, and is about ½ mile north of the main Samfordyce field. A big fault, estimated at 600 feet on the Frio zone and 900 feet on the Vicksburg, cuts the field in a northwest-southeast direction between the present field production and the new discovery. This would mean that the discovery sand found at 2750 feet in the main field would be at approximately the same level as the sand in the Fohs Oil Company test.

Phillips Petroleum Company's Flores 1, completed in December of last year, cut the fault between 4200-4300 feet, finding practically no Vicksburg, topped the Jackson formation at 4375 feet, Hockleyensis at 6970 feet, and was still in it at 9708 feet, where the well finally was abandoned. Plugged back, it was finished through perforations at 5840-5900 feet, in the Whitsett, apparently at the level of the Cole sand, where it made a distillate producer.

Presages More Drilling

The fact that the Fohs test has determined crude production on the down-throw side of the fault indicates that another development campaign may immediately be commenced in this field. Producing conditions like this exist in other fields, notably in Saxet district, where both the up-throw and down-throw portions of the structures are productive in the same sands.

Other interesting events along the Rio Grande Valley trend were in the Sun-Kelsey area near the common corner of Starr, Hidalgo, Brooks and Jim Hogg counties.

Humble Oil & Refining Company's McGill 1, in the Brooks County sector of the Kelsey pool, found the regular sand at 4690-4725 feet carrying gas, and went ahead, picking up another sand at 4802 feet. At last reports it was coring at 4832 feet, still in the sand.

An outpost to the Sun field, Sun Oil Company's Olivares 2, was 5650 feet, where electric formation device was run. It has been plugged back to test higher levels.

Forty-acre spacing for Seymour field

An order has been issued by the Texas Railroad Commission providing for 40-acre spacing in the new Seymour field, Baylor County. Wells must be drilled 660 feet from lease lines and 1320 feet apart.

Proration is on acreage and per well with 50 percent allocated on each factor, and although 40 acres is the standard proration unit, as much as 70 acres may be assigned to the final well on the lease to avoid drilling fractional units.

Regulations provide for 100 feet of surface casing cemented to the surface and an oil string cemented to 50 feet above the shoe.

40-acre spacing ordered for Calvin lime production

Forty-acre spacing for Viola lime production in the Calvin pool, Hughes County, has been approved by the Oklahoma Corporation Commission. The spacing was sought by Phillips Petroleum Company on 2440 acres of land in township 5 north, range 10 east.

One well, Beeker 1, NWc SW 8-5n-10e, has been producing from Viola lime since March, 1938. It was drilled to 6268 feet and plugged back and treated with acid. It flowed for a short time but since November has been producing with submersible pump. Its total output is more than 43,000 barrels and currently it is producing 100 barrels of oil and 900 barrels of water daily.

New Jersey plans to control drilling

Drilling for oil and gas in New Jersey would be placed under the control of the state board of conservation and development under terms of a bill pending in the upper branch of the New Jersey legislature. Introduced by Senator Bowers, the measure provides that permits be obtained for all wells drilled, and that drillers be licensed at $25 annually.

Well permits would cost $2, and on completion of a well the driller would be required to file a report giving the log, the size and depth, diameters and lengths of casing and screen installed, static and pumping levels, yield and any other information the board may require.

Provisions of the licensing act would also apply to water well drillers.

Issuance rate of West Virginia permits drops

Charleston, W. Va.—West Virginia drilling activity, as reflected by permits issued by N. P. Rhinehart, chief of the state department of mines, declined 7 percent in January from the corresponding month a year ago. Permits issued totaled 43, compared to 46 in January, 1938.

Permits by counties during January were: Cabell 4, Calhoun 8, Clay 4, Gilmer 3, Jackson 2, Kanawha 6, Lincoln 2, Mingo 1, Pleasants 7, Putnam 1, Ritchie 1, Roane 2, Tyler 1, and Wayne 1.

New refinery sales firm organized in Tulsa

Formation of Petroleum Sales Company, an Oklahoma corporation, was announced last week. It is a $400,000 concern, which will engage in the buying and selling of refined petroleum products. A. V. Borque, who has been secretary of the Western Petroleum Refiners Association, Tulsa, is president.

Texas Gulf Coast

Well regarded failure extends Satsuma northwest.

Prepare to test Fairbanks mile northeast outpost.

Houston.—William & Gillespie's Behne 1, three fourths mile northwest of production at Satsuma field, Harris County, W. C. R. R. No. 2, indicated it would extend production last week when a drill-stem test at 6830-64 feet recovered 720 feet of 40-gravity oil and 30 feet of oily mud in nine minutes through quarter-inch chokes. Pressure was 75 pounds. The hole is bottomed at 6864 feet; it carries 5½-inch casing. Sandy shale with an odor of oil and gas was recovered at 6853-63 feet. An electrical survey at 6852 to 6862 feet indicated the sands would produce. The well ran about normal with other wells at Satsuma. Strangely, reports the middle of the past week were that the well would be abandoned at 7000 feet.

Over a mile northeast of production at Fairbanks, Harris County, Kirby Petroleum Company's Daniel 1 showed salt water when casing was perforated with six shots at 7237 to 7239 feet and has been plugged back to 7202 feet prior to making another test. If this latter horizon is not productive, the well will be completed up the hole in a gas and distillate sand cored around 6900 feet. Daniel 1 was drilled to 7248 feet and logged a sand with an oil show at 7228 to 7248 feet.

Housh & Thompson's Abraham 1, on the northwest side of Fairbanks was preparing to test at 6814 to 6848 feet. On the southeast side of the field, Ralph Johnston et al's Mahoney 1 was flowing into tanks with no gauge after casing was perforated at 6821 to 6826 feet.

League City Outpost to Pump

Northeast of production at League City, Galveston County, Phillips Petroleum Company's Patton 1 will be put on a pump after a production test at 9080 to 9083 feet showed oil and salt water. The same operator's Ott 1, perforated last week from 9245 to 9265 feet, showed oil and salt water. The perforations were squeezed to shut off the water. Another test will be made over the week-end.

South of the discovery Wilcox producer at Ace, Shell Petroleum Corporation's Ducette 1, P. A. Sublett Survey, Polk County, was coring at 7701 feet and soon should be down to the Wilcox sand which was found in Peyton Brothers' Kirby Lumber Company B-3 around 7750 feet. According to reports, Shell's well failed to find the shallower sands.

On the Bolivar prospect, Galveston County, Sun Oil Company is preparing to core deeper in Cade 2, A. Dickson Survey, after running 9⅝-inch casing

TEXAS GULF COAST
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Ace—		
Peyton Bros., Kirby Lbr. Co. 1	180	7762
Cheek—		
Humble, Failor 1	101	7728
Dickinson—		
Bennett Pet. Co., Deats 1	720	8815
Mar-Tex Oil Co., M. Stewart 10	746	8673
Eureka—		
Jack Frazier, Vollmer & Nieman 4 (wo)	27	8080
Housh & Thompson, Helberg 1	60	7718
Fairbanks—		
Amerada-Stanolind, Hahl 2-K	519	6852
Mills 9	130	6857
Spaulding 1-B	94	6841
Gem Oil Co., Reid 8	149	6849
Smith & Owenby, White 2	147	6855
Friendswood—		
Humble, West Fee 7-B	600	6044
West Fee 9-B	610	6047
Hardin—		
Atlantic, Rives 1	445	7575
Humble, Partlow 1-B	480	7575
League City—		
Gulfboard-Salt Dome, Ross-Stewart 1	120	8975
Magnet—		
Humble, Cockburn 10	120	5538
Orange—		
Hankamer, Lucas et al, State 1	129	5970
Saratoga—		
E. W. Skinner, Parrish 1	*	2853
Thompson—		
Humble, Davis 4	408	5393
Withers—		
Texas Co., Pierce Estate B-27	484	5546
Pierce Estate C-56	472	5546
Harris County—		
Cron & Gracey, R. D. McDonald 1, Huffsmith area, A. Lawson sur	*	6115
Orange County—		
Sun, Lutcher Moore 1, Echo area, B. Johnston sur	*	9705

* Failures; † Junked; ¶ Million cu. ft. gas.

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to 8009 feet to protect two sands which were cored at a shallower depth. If no new sands are found deeper the hole will be plugged back for production tests.

Echo Test Abandoned

Sun Oil Company's potential discovery well at Echo, Orange County, was abandoned at 6320 feet last week after two production tests showed salt water; Lutcher Moore 1, B. Johnston Survey, had been drilled to 9705 feet and was tested at 8985 to 9010 feet. The well came in flowing 100 barrels of fluid daily through a quarter-inch choke, from 22 to 85 percent salt water. Tubing pressure was 750 pounds. The wildcat died and was plugged back and tested at 6320 feet. No plans have been made for another wildcat in the district.

Headed for Wilcox

Mills Bennett Production Company has decided to carry Truchard 1, east of Mentz, Ed. D. Corbit Survey, Colorado County, to the Wilcox formation. The wildcat has been shut down at 7505 feet after running an electrical log. Operations are being resumed and the Wilcox formation should be encountered within the next 400 or 500 feet.

On the northeast edge of Eureka field, Harris County, Housh & Thompson completed Helberg 1, H. Reinerman Survey at 7694 to 7698 feet. The well flowed 33 barrels in 14 hours through a 5/64-inch choke with a tubing pressure of 1850 pounds and a casing pressure of 2250 pounds.

McFaddin operating rules are changed

Operating rules for the McFaddin field, Refugio and Victoria counties, have been revised in an order of the Railroad Commission issued last week. The time for allowing cement to set has been cut from 48 to 24 hours, and the plug may be drilled at the end of 48 hours instead of 72 hours, as provided in an earlier order.

The weight of the cement slurry has been increased from 14½ to 15 pounds. The commission pointed out in its order that it had found that cement in these high pressure wells, ranging in depth to 10,000 feet, obtained 80 percent of its strength within 24 hours, and that it had a greater than normal strength because of the high temperatures encountered.

East Bryson hearing

Revision of the boundary lines of the East Bryson field, Jack County, will be considered at a hearing before the Texas Railroad Commission scheduled for March 7 at Austin.

In an order issued March 31, 1938, the commission fixed the boundary lines of the field at "a line located 1865 feet west of the west line of the Thos. M. League Survey in Jack County, and extending due north and south through the Sam Rooke Survey, the A. Sewell Survey; and J. W. Coates Survey, the W. Higgins Survey, the J. G. Enloe Survey, and the Isaac White Survey, all in Jack County . . ."

The area to be considered is all that undeveloped part of Jack County which lies north of the boundary line in the 20-acre per well spacing area.

South Louisiana

Potential field opener cores additional oil sands.

Bay St. Elaine well opens new sand with good flow.

Lake Charles.—Vendome Petroleum Company's Kennelworth 1, east of St. Bernard, St. Bernard Parish, cored additional oil sands last week from 10,880 to 10,900 feet which contained odors of oil and gas after drilling cement plugs out of 9⅝-inch casing set at 10,809 feet. The previous week the wildcat cored a broken sand from 10,597 to 10,650 feet which had odors of oil. An electrical log indicated the well would open another deep field for South Louisiana and the first for St. Bernard Parish. Drilling continues.

Misses Regular Sand

Shell Petroleum Corporation's second well at South Houma field, Terrebonne Parish, is reaching a critical depth: Peters 2 was coring sandy shale at 10,305 feet at the end of the week and has so far failed to pick up the 10,300-foot sand found in the discovery well. A sand was encountered in the well at 10,163 to 10,170 feet, and a drill stem test made from 10,165 to 10,170 feet recovered 10 stands of oil, mud and salt water, 10 stands of salt water and 70 stands of mud in 10 minutes.

A new oil sand was discovered at Bay St. Elaine field, Terrebonne Parish, last week by The Texas Company when State Bay St. Elaine 2 cored oil sands at 6640 to 6682 feet and at 6868 to 6952 feet. The well came in flowing 490 barrels of 26.2 gravity oil daily through a ⅛-inch choke, with a tubing pressure of 2750 pounds. This is one of the best wells ever completed in the field. It carries a string of 9⅝-inch casing to 6510 feet.

In Lake Ponchartrain, Orleans Parish, W. T. Burton's State 1, 13s-10e, was abandoned last week at 11,149 feet. With the seat of the testing tool at 8153 feet a drill stem test on this well, made in two hours through quarter-inch chokes, showed no pressure, 32 stands of mud, salt water, and a trace of oil. Swabbing yielded salt water.

Sid Richardson's second well at Eola, Avoyelles Parish, is coring for the Sparta formation. Last week the well was down to 7200 feet in shale. The well topped the Cockfield at 6500 feet and cored sands showing oil from 6506 to 6511 feet and salt water sands from 6511 to 6521 feet. The well is running about normal with the discovery well.

New Creole Sand

Superior Oil Company logged a new sand out in the Gulf of Mexico at Creole field offshore of Cameron Parish last week and was coring ahead at 6703 feet. A core from 6690 to 6700 feet showed five feet of sandy shale and two feet of sand on bottom which showed oil and gas and no salty taste.

The second well to be completed in the Haas sand at Villa Platte, Evangeline Parish, is Continental Oil Company's Vidrine 1, Section 34-8s-2e. It flowed 210 barrels in 14 hours through a 3/16-inch choke, with a tubing pressure of 2300 pounds and a casing pressure of 2600 pounds from 8976 feet.

The Texas Company's second well at Horshoe Bayou, St. Mary Parish, is preparing to make a production test in a new sand for the field. Horshoe Bayou 2 was drilled to 12,770 feet in water sand and a short string of 6⅝-inch casing was set at 12,733 feet. Before setting casing an electrical log showed oil sands at 11,782 to 11,804 feet and at 11,815 to 11,847 feet. Casing was perforated from 11,829 to 11,847 feet with 30 shots and from 11,792 to 11,804 feet with 80 shots.

In the Chalmette area, St. Bernard Parish, William Helis' Moreaux & Nunez 1 was abandoned last week at 9634 feet after failing to get an electrical log to bottom. The derrick and equipment is being moved to the Pikes Peak prospect in Pointe Coupee Parish where Falcon-Seaboard is preparing to drill Hobgood 1 to the Wilcox formation.

Amerada Petroleum Corporation has quit another deep well at Raceland, Lafourche Parish. Godschaux Sugars 2 was abandoned at 11,114 feet. The lower sands carried salt water.

To Test Bancroft Outpost

Southeast of production at Bancroft, Beauregard Parish, Republic Production Company is preparing to make a production test on L. Whitman 1 after coring oil sands from 7361 to 7371 feet; The hole is bottomed at 7391 feet; seven-inch casing is set at 7371 feet.

In the Graben area between Gillis and English Bayou field, Calcasieu Par-

SOUTH LOUISIANA
Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Bayou Blue—		
Humble, Wilberts & Son 9	*	1869
Bancroft—		
Republic, Lutcher Moore 5	403	7348
Charenton—		
St. Mary Oil Co., Hertel 6	45	1132
Darrow—		
Humble, Rose 2	*	6412
East Hackberry—		
Gulf, Irwin 25	*	3784
Gueydan—		
A. M. Barbee, G. L. Humble 1	*	4685
Jennings—		
L. L. Oil Co., Houssiere Latreille 5	10	1840
Raceland—		
Amerada Pet. Corp., Godschaux 2	*	11,114
Sulphur—		
Union Sulphur, Fee 806	10	4009
Venice —		
Tide Water, Manhatten Fruit Co. 9	120	5710
Orleans Parish—		
W. T. Burton, State Lake Pontchartrain 1, 13s-10e	*	11149
St. Bernard Parish—		
William Helis, Nunez 1, Chalmette area 34-12s-12e	*	9634
St. Martin Parish—		
Texas Co., St. Martin Land Co. 11, Henderson area, 21-8s-7e	*,	9404
Continental's Standard of Kansas 1, North of St. Martinville, 13s-10s-6e	*	8247

* Failures; † Junked; ¶ Million cu. ft. gas.

ish, Fohs Oil Company's Green Acres 1 was coring in sandy shale at 5150 feet at the end of the week and expect to pick up a sand around 5250 feet. The operators already have cored gas sand at 4400 to 4466 feet and oil sand at 4476 to 4479 feet. Another test sand was cored at 4636 to 4676 feet.

On the northwest side of Choctaw, Iberville Parish, Louisiana Crusader Oil Company is preparing to complete another well. Schwing 6 is bottomed at 8609 feet in shale after coring oil sand up the hole. Cores taken from 8222 to 8232 feet, 8236 to 8244 feet, 8290 to 8297 feet, 8324 to 8331 feet, 8335 to 8355 feet and from 8370 to 8380 feet cores showed oil.

At Big Lake, Cameron Parish, Union Sulphur Company completed P. D. Hebert 1 in a new horizon at 7845 feet last week. The horizon had been cored but never has been produced from. Hebert 1 was plugged back and perforated at 7843 to 7845 feet with 19 shots. It came in flowing 13 barrels of 44.6 gravity oil daily through a 11/64-inch choke.

Ashland takes over lines of Illinois in Kentucky

Holdings of Illinois Pipe Line Company in the Owensboro, Kentucky, field have been taken over by Ashland Oil & Refining Company, Ashland, Kentucky. W. H. Keffer, Ashland Oil president, who with A. C. Welch, Owensboro superintendent of the Illinois company, confirmed the transaction, said a detailed statement would be issued later.

North Louisiana Fields

Natchitoches Parish wildcat testing oil show in Paluxy. Third Vivian producer does not reestablish area interest.

Shreveport.—Jack Lent and associates were running 7-inch casing to 3282 feet last week in E. L. Whatley 1, SW SE SW 17-10n-10w, Natchitoches Parish, near the southeast flank of the Sabine Uplift, after this wildcat test showed 135 feet of 42-gravity oil and 100 feet of mud, free of water, in a 7-minute drill-stem test in the Paluxy from 3282 to 3296 feet. The hole was plugged back from 3510 feet. Nearest production in the Paluxy is 10 miles away in the old Pleasant Hill field, discovered in 1927. Later a wildcat well was completed in the same horizon in Section 17-9n-11w, Sabine Parish, which made 40 barrels of oil daily for several years, but other tests in the vicinity were either small gas wells or failures. One well in this horizon was completed last year in Section 23-7n-14w, Sabine Parish, Blue Lake district, but offsets in three directions were failures and no other wells there have so far been completed in this horizon.

The Shreveport field, producing from basal Glen Rose lime, added its thirteenth oil well last week in Ford Oil Company's (R. L. Bauman et al) E. R. Dorian 1, SE NE SE 34-18n-14w, completed at 5599 feet, flowing first 24 hours only 135 barrels through open choke but later after treatment with 500 gallons of acid it made 264 barrels in 24 hours through ½-inch tubing choke with casing pressure 1350 pounds and tubing, 750. Gravity of the oil was 49.6 and gas/oil ratio was reduced to 810 to 1, from 3280 to 1. Gas production for the 24-hour period was 2,138,000 cubic feet. Three new locations, all offsetting producers, were announced in the Shereveport field.

Fifth oil well for the "D" sand of the lower Marine and tenth oil well for the lower Marine including the "E" or Bodcaw sand at Cotton Valley, Webster Parish, was added last week in Oliphant Oil Company's Hodges A-1, C NW NE 3-20n-10w, on the south flank of the structure, gauging 897 barrels in first 24 hours through ¼-inch choke with casing pressure 1650 pounds, and tubing, 1475 pounds. This well logged the "D" sand from 8588 to 8616 feet and casing was perforated from 8599 to 8616 feet. Total depth is 8690 feet. Two other tests, both in Section 36-21n-10w, are running final casing or electrical log preparatory to doing so. These are the most advanced of the tests at Cotton Valley and both indicate oil production in the "D" or "E" horizons.

George Ellis of Beaumont, Texas, has spudded Walker 1, NW NW SE 8-4n-12w, southern Sabine Parish, south of the Angelina-Caldwell Flexure, for a proposed 5000-foot test, on a block that extends across the river into Sabine County, Texas. Samuel S. Alexander re-perforated casing from 2995-3045 feet with 126 shots in Stell A-1, NE NE 5-12n-16w, DeSoto Parish wildcat, that flowed 25 to 30 barrels of oil daily from the Paluxy but probably will be standardized.

NORTH LOUISIANA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Caddo Parish (Vivian-Pine Island)—		
Burnham Dr. Co., Gray 1, 34-22n-16w	*	2495
Riggs & Gilger, J. W. Browning 1, 27-22n-16w	*	2502
Rhoda Armstrong, Henderson 2, 27-22n-16w	210	2500
Caddo Parish (Pine Island)—		
Magnolia, Levee Bd. 6, 7-20n-15w	10	1563
P. T. Alexander, Fee 1, 1-20n-16w	55	1540
Caddo Parish (Shreveport)—		
Ford Oil Corp., Dorian 1, 34-18n-14w	264	5599
La Salle Parish (Urania)—		
G. C. Walsenham, Dean 1, 23-9n-1e	5	1652
Sabine Parish (West Zwolle-Blue Lake)—		
Sutton-Zwolle Oil Co., Sabine 2, 23-7n-14w	*	3938
Webster Parish (Cotton Valley)—		
Oliphant Oil Co., Hodges A-1, 3-20n-10w	897	8690

* Failures; † Junked; ¶ Million cu. ft. gas.

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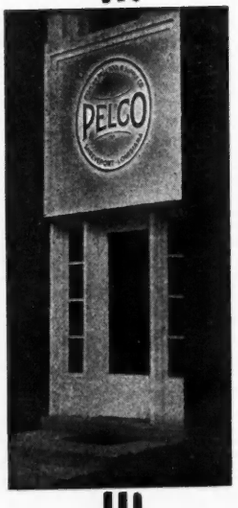

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SHREVEPORT LOUISIANA

PELCO

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New Iberia—Monroe
Cotton Valley—Greggton
Magnolia—Houston

Triangle Drilling Company will attempt to extend the 3100-foot oil producing horizon at Sligo, Bossier Parish, one mile west, having spudded Sandidge 1, C SE SW 14-17n-12w.

J. O. Whittington's P. C. Grayson 1, C SE SE 30-19n-15w, Caddo Parish wildcat, with elevation of 286 feet, after logging massive anhydrite from 4425 to 4490 feet, topped Pettet (basal Glen Rose lime) at 5635 feet and logged a showing of gas and distillate in that horizon from 5693 to 5711 feet, and later drilled ahead below 5890 feet.

Union Producing Company successfully cut out hung drill pipe in Walker Unit 1, C SE 30-18n-8w, Webster Parish, Sibley district, 9000-foot test, and with hole clean prepared to drill ahead at 7837 feet.

One well, the third commercial well for the Vivian offshoot to the Tokio horizon of the old Pine Island field, Caddo Parish, was completed last week at Rhoda Armstrong's Henderson 2, NE SW SW 27-22n-16w, flowing 210 barrels of net oil in 24 hours, with 25 percent salt water. It is 720 feet north of the second producer in the field. Two other operations in that area were standardizing and another was waiting orders to set casing after reaching the producing level. Northeast of Vivian the Caddo Levee Board owns 640 acres of leases and advertised for bids thereon to be opened February 27. There were no bids submitted, two bids previously submitted having been withdrawn due to the decline of interest at Vivian because of salt water encroachment and lenticularity of the Tokio there.

Bad roads due to high water and continued rain continued to hamper operations in North Louisiana, the Cotton Valley, Shreveport and Zwolle fields, the three most active areas, being most affected.

F. Lee Watson is completing a block around Section 35-20n-7w, Claiborne Parish, on the southeast flank of the old shallow Homer field, and F. P. Clements is completing a block on the southwest flank of the same field around Section 11-20n-8w.

Louisiana permits

Shreveport.—Ten drilling permits were issued last week by the Louisiana Conservation Commission of which 6 were in North Louisiana divided among the following parishes: Caddo, 4; La Salle, 1; and Sabine, 1. The four in South Louisiana were in the following parishes: Cameron, 1; East Baton Rouge, 1; and St. Mary, 2.

Bids to be opened on Hamilton Dome leases

Washington, D. C.—Bids will be opened by the General Land Office at Cheyenne, Wyoming, March 14, for the leasing of approximately 240 acres of public land in the Hamilton Dome oil and gas field, Hot Springs County, it was announced February 10 by Secretary of the Interior Harold L. Ickes.

The land will be offered in two units of 80 and 160 acres, respectively, to the bidder of the highest bonus per acre. It was explained that the leases are being made to prevent loss to the government by depletion of the reserve in the Hamilton Dome area through drainage by private drilling operations.

Arkansas Fields

Two wildcat locations for Permian lime tests

El Dorado, Ark.—Search for more Permian-lime production in South Arkansas continues unabated, locations having been announced last week for two wildcat tests with that deep horizon as their objective. One location was in Columbia County, the other in Union, both being geophysical prospects.

Approximately midway between two oil fields producing from the Permian, Buckner and Magnolia (Kerr-Lynn), Phillips Petroleum Company staked location for Askew 1, C NE NW 4-17-21, Columbia County. In Union County, Oliphant Oil Company staked location for a Permian lime wildcat, Union Sawmill Company 1, C SW NW

ARKANSAS Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Columbia County (Village)—		
Standard, Lewis 1, 15-17-19	288	7439
Mississippi County (Wildcat)—		
Benedum & Trees, Winston Mack 1, 3-15-12	*	4250
Miller County (Rodessa)—		
Gerhig Co., Watson 4, 2-20-28.....	720	6221
Frankel et al, Watson 2, 2-20-28..	480	6215
Lyons & Merritt, Matlock 1, 2-20-28	480	6192
Union County (Rainbow City-Champagnolle)—		
Brooks et al, Nash 2, 7-17s-13w...	*	3086

* Failures; † Junked; ¶ Million cu. ft. gas.

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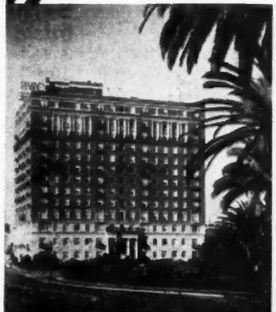

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22-19-14, six miles southeast of production in the shallow South El Dorado field, and about the same distance north of Standard Oil Company of Louisiana's block in Union Parish, Louisiana, near Lockhart where it recently revived location for a Permian lime test in township 23 north, range 2 west.

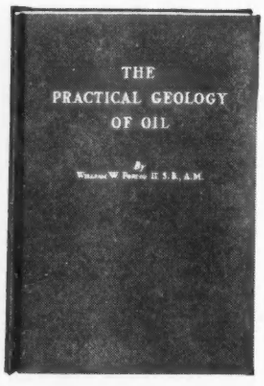
Oliphant Oil Company secured two thirds interest in the Union County block of 5000 acres for an 8000-foot test from C. H. Murphy and associates.

Original Permian producer in Arkansas will deepen

El Dorado, Ark.—Phillips Petroleum Company has taken out permit to deepen J. D. Reynolds 1, SE SE NW 27-15-15, Ouachita County, Snow Hill district, first well in Arkansas or North Louisiana to be completed as a commercial well in the Permian lime. Total depth was 4926 feet and the well was completed in 1936. As a result of this well's successful completion as a gas-distillate well the campaign for more Permian production was started in South Arkansas, where now production in this horizon is found at Schuler, Buckner, Magnolia, Atlanta, and Village. The official name of the producing Permian lime as chosen by the old Arkansas Board of Conservation was the "Reynolds Lime" from the name of the discovery well.

Arkansas permits

El Dorado, Ark.—Seven drilling permits were authorized last week by the Arkansas Oil and Gas Commission, as follows: Columbia County — Atlantic Refining Company, Levi Garrett C-1, C SW SE 13-17-20; Levi Garrett D-1, C NE NW 24-17-20; Tide Water Associated Oil Company and Seaboard Oil Company, J. A. Price 1, C NE SW 15-18-19; Nevada County—J. B. Franks, P. C. Grayson 2, 150 N & W SEc NW SE 4-14-20; P. C. Grayson 3, 150 N & E SWc NW NW SE 4-14-20; Berry Asphalt Company, Grove Land & Timber Company 1, 330 west and 165 feet north SEc north half NE SW 4-14-20; and Grove Land & Timber Company 2, 165 feet north and east SWc SW NW 4-14-20.



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Alabama test setting pipe to investigate reported show

Mobile, Ala.—H. A. Stebbinger has set 7-inch casing at 4500 feet and 4½-inch liner to bottom at 4950 feet for a test of Robertson 1, NE NE 19-10n-26e, Barbour County, Alabama. Showings at this level have been unofficially reported. A showing of oil on the pit at 2200 feet was reported previously. Elevation is 555 feet.

Florida Oil Discovery Company is preparing to make a test in Sholtz 2, SW SW NE 9-15s-13e, Levy County, Florida, at 4415 feet. Cores from 4375 to 4415 feet are reported to have shown some oil and gas.

Peninsular Oil & Refining Company's Cory 1, C NW 6-55s-34e, 41 miles west of Miami, is reaming to bottom at 2850 feet.

Phillips Petroleum Company is shooting a block of acreage in townships 1 north and 1 south, ranges 9, 10, and 11 west, in Stone and Perry counties "in the trend" in Gulf Coastal Mississippi. This company still has a seismograph unit working around the Mobile Bay littoral.

A crew of 18 geologists, seismograph experts and engineers who have been working for the last 7 months in Hendy and Lee counties, Florida, have returned to Texas, after covering more than 250,000 acres in the employ of Sun Oil Company. Three companies have approximately three million acres under lease or option in South Florida, with Lee and Hendy counties having seen a large jump in leasing in the last year. Sun Oil Company has a gravimeter unit working in South Mississippi in Copiah, Jefferson and Lincoln counties, and has a magnetometer unit working in Lamar County. Seismic Explorations, Incorporated, has a unit near Lucedale, George County.

Barnsdall Oil Company is detailing an area centering around Section 5-2n-1w, Wilkinson County, Mississippi, having also leased 10,000 acres centering around Section 34-1n-1w, same county.

Garth and associates of Fort Worth, Texas, have leased approximately 4000 acres around an old test of Sinclair et al in Section 12-18s-9w, in Tuscaloosa County, Alabama.

Cleve Love and associates are preparing to resume at 5218 feet in S. F. Johnson 1, NE SE 29-6n-1w, Hinds County, Mississippi, wildcat.

New Mexico Fields

Monument southeast well will mean more development

Hobbs, N.M.—More development is in store for the southeast portion of the Monument field, Lea County, as result of completion of an outpost natural producer. The county was credited with 8 new operations the past week, including a wildcat near the west border. This compares with 9 new tests the previous week. Expansion of field work may follow in the wake of the restoration of recent production allowable per well in Lea County to 55 barrels daily effective March 1. The wells that are prorated on a flat quota basis were given a boost of 6 barrels. Some doubt prevails as to whether the pipe line companies will absorb the full increase authorized by the commission, as one of the largest transporters of crude has been credited with congested facilities.

Revival of interest in the southeast sector of the Monument field arose from completion of Continental Oil Company et al's Britt 4-B-15, NW SW SW 15-20s-37e, flowing 15 barrels of 32-gravity oil hourly natural through ¾-inch choke from lime at 3822-53 feet, with an elevation of 3553 feet. The partnership's Britt 2-B-10, C W½ NW SW 10-20s-37e, a mile north, missed the regular saturated lime horizon, and was considered a probable failure in coring to 3960 feet, or 392 feet sub-sea. The Texas Company's State-Lieu 16-H, C NE SW 20-20s-37e, an inside well near the Monument-Eunice field junction, was showing 1½ percent bs&w in flowing 95 barrels of fluid in 23 hours through choke after using acid at 3850 feet, or 323 feet sub-sea. The company has rigged up for State-Lieu 17-H, NW NW SW 19-20s-37e.

Plugging orders were issued the past week for Barnsdall Oil Company's State-Humble 1, C NE SE 33-16s-36e, west outpost for the Lovington pool, after failing to respond to acid treatment at 5269 feet. The test checked low on all geological markers, and provided a surprise through having missed the main water table in drilling to 1367 feet sub-sea. Stanolind Oil & Gas Company's State 2, the only active test in the pool, was drilling at 3540 feet.

Development of the northwest portion of the Maljamar field is to be resumed by Maljamar Oil & Gas Company. Standard tools have been moved in to drill Grace Mitchell 2, SW SE SW 5-17s-32e, near an old isolated producer. P. B. English et al's Miller 1, C NE SE 18-19s-32e, wildcat near the Lea-Eddy County line, has resumed after landing surface pipe.

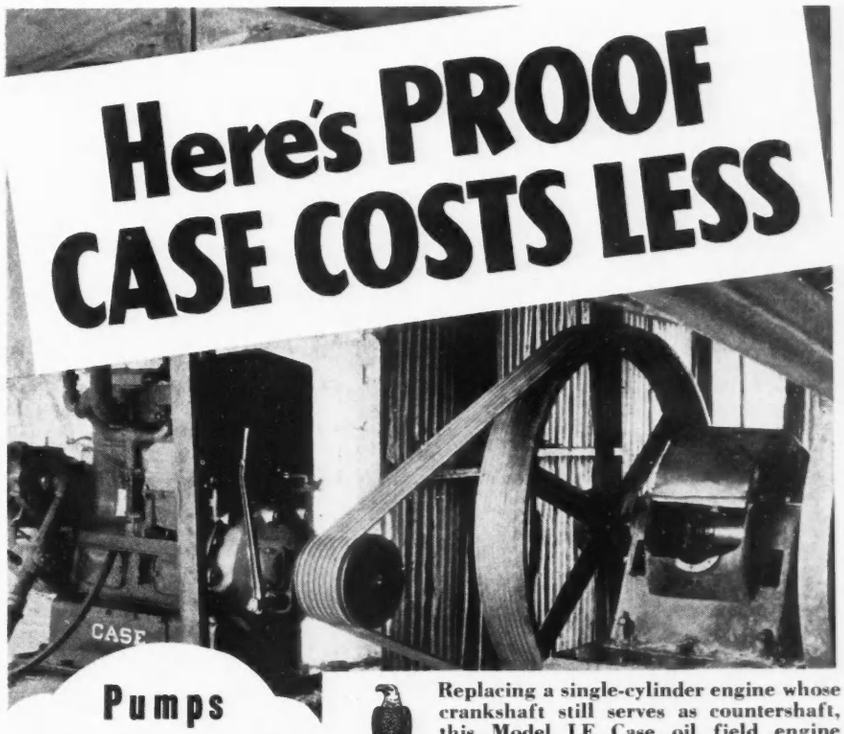
Bottom-hole water at a comparatively high level was credited to Magnolia Petroleum Company's State 2-J, C NW SE 22-17s-34e, offsetting production in the west portion of the Vacuum field. Preliminary gauge after dual acid treatment at 4740 feet, with an elevation of 4052 feet, credited the well with flowing 16 barrels of oil in 3 hours. Water made its appearance later. The well will be plugged back. The company accounted for one of the two new operations in the field in drilling State-Bridges 27, C SE NE 26-17s-34e, which has cemented 10-inch surface pipe at 831 feet. The other project was Standard Oil Company of Texas' State 2-6-34, C NE SW 34-17s-35e.

Repollo Oil Company's State 2-197, half mile north of a flowing wildcat on a northwest trend from the Vacuum field, failed to encounter saturation in drilling at 4775 feet. It will be carried to the water level. This test occupies a favorable structural position when correlated with the company's producer, but the projected oil zone lacked porosity.

NEW MEXICO Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Lea County (Langlie)—		
Richmond Pet. Co., State-Texas Co. 1-A, c nw sw 2-25s-37e	456	3446
Lea County (Mattix)—		
Olsen et al, Blinebry-Texas Co. 1, c sw sw 29-23s-37e	211	3575
Lea County (Monument)—		
Continental et al, Sanderson 3-B-14, c e½ se sw 14-20s-36e	1008	3840
Lea County (Penrose)—		
Two States Oil Co., State-Gulf 4, c sw nw 16-22s-37e	120	3690
Lea County (Vacuum)—		
Humble, State 1-K, c se se 28-17s-35e	408	4640
Phillips, State-Santa Fe 21, c ne ne 33-17s-35e	912	4615
State-Santa Fe 23, c sw sw 26-17s-35e	1235	4580
McKinley County—		
Petroleum Prod. Co., Santa Fe 5, 1-17n-9w	150	1604
San Juan County—		
Continental et al, Rattlesnake 86, near c ne 2-29n-19w	*	902
Goodrum & Vincent, Seitzinger 1, 23-29n-11w	*	945

* Failures; † Junked; ‡ Million cu. ft. gas.



Replacing a single-cylinder engine whose crankshaft still serves as countershaft, this Model LE Case oil field engine works 24 hours a day taking 805 barrels of oil and water from a 2350-foot well for Coffield and Guthrie, Inc., of Corsicana, Texas. Their records show that in 11,600 hours the only repair or replacement has been one set of spark plugs and one fan belt.

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CASE OIL FIELD ENGINES

Rocky Mountain States

Leo sand production at Lance Creek is extended

Casper, Wyo.—Producing area of the Leo pool in the Lance Creek field, Niobrara County, was extended to the south and east again this week by Adams Oil & Gas Company and Felmont Oil Corporation's Baker 1, NW NE SW 8-35n-65w, ¼-mile south and ½-mile east of production. It is making 162 barrels of oil daily on pump from the second Minnelusa horizon at 5636 feet. Shooting and acidizing failed to make it flow. Completion of this extension has again focussed drilling activity on the southern side of the field. Continental Oil Company has started work on Dielman 3-B, SW SE NW 8-35n-65w, north offset to the new Adams producer.

Half-mile west of the extension and ¼-mile south of the Continental Oil Company's Dielman 1-B, former southernmost producer in the field, Minnelusa Oil Corporation's H & M 1 (Lease 5), NW NE SE 7-35n-65w, is waiting on cement to set around 13⅜-inch casing cemented in hole at 300 feet. Company is also preparing to deepen Joss 2, NE SW 6-35n-65w, a former Sundance producer on the west margin of the Sundance pool at Lance Creek.

Ohio Oil Company's eastern outpost well in the Lance Creek area, Leo 1 OPC-7, NWc SE 35-36n-65w, is testing production in the Sundance horizon through casing perforations after plugging back to 4420 feet from 5672 feet in the base of the Leo sand. Another old well, Converse Sheep Company 8, NW SE SW 32-36n-65w, top structure location completed in 1938 as the first gasser in the Leo sand formation, has been acidized with around 15,000 gallons and is making 189 barrels of oil and 2,500,000 cubic feet of gas daily. When originally completed this well made around 1,500,000 cubic feet of gas and showed no free oil in the hole. Total depth is at 4993 feet.

Rotary is being moved in on Ohio Oil Company's Agnes Rohlff 3, C SE NE 32-36n-65w, Sundance producer which is to be deepened from 3974 feet to the Leo sand of the Minnelusa series. On the same lease, well No. 5, NW NE SW 32-36n-65w, is nearing the Basal Sundance series at 3611 feet.

Saturated Sundance sand was logged at 1962 feet in Sinclair-Wyoming Oil Company's Lost Soldier 82, NE SW SW 11-26n-90w, shallow Sundance well in the Lost Soldier field, Sweetwater County, Wyoming, and well is drilling ahead at 2098 feet in the formation. Portable rotary equipment has been used in putting down the hole which is the latest to drill to the Jurassic producing beds of the field.

Colorado

Mountain Fuel Supply Company's Florence Wilson 1, NW SE NE 22-12n-100w, gas discovery well in the Hiawatha field, Moffat County, northwestern Colorado, which is deepening to test for oil production in lower formations of the Tertiary Wasatch beds, reports saturation at 2498-51 feet and is running a production test of this formation.

MOUNTAIN STATES Completions

COLORADO

Company, Well and Location	Init. Prod. Bbls.	Depth
Fremont County (Florence)—		
Stanley Thomas, Rickwalt 1, se se 2-19s-70w	*	2460
Routt County (Steamboat Springs)—		
Steamboat Springs Dr. Synd., Brown 1 cnw ne 1-6n-86w	*	1790
WYOMING		
Carbon County (Big Medicine Bow)—		
Ohio & California Co., Union Pacific-Johnson 7, cs ne sw 23-21n-79w	*	5836
Niobrara County (Lance Creek)—		
Argo Oil Corp., Elliott 9, nwc nw se 5-35n-65w	598	3968
Sweetwater County (Lost Soldier)—		
Sinclair-Wyoming, Lost Soldier 81, se nw 11-26n-90w	50	2064
Weston County (Dewey Dome)—		
T. R. Ragland & Osage Tr. Co., Government 1, cel nw sw 31-42n-65w	*	2535

*Failures; †Junked; ¶Million cu. ft. gas.

Indian lease sales

Leases on 3000 acres of Kiowa Indian lands in Kiowa and Caddo counties, Oklahoma, brought $22,000 at the sale held at Anadarko, February 24. Tide Water Associated Oil Company, Phillips Petroleum Company, Magnolia Petroleum Company, Indian Territory Illuminating Oil Company and Gulf Oil Corporation were the principal buyers.

Leases on 79 tracts of Osage tribal Indian lands will be offered at auction March 21 in Pawhuska. The offering consists of 12,640 acres.

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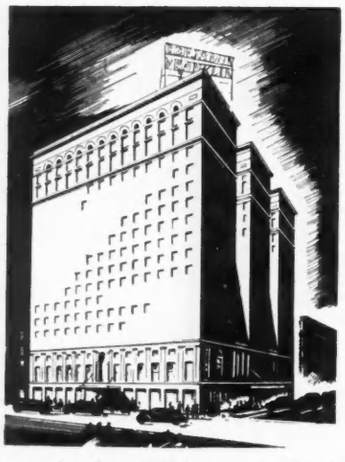

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California Fields

Good completion spur to West Montebello drilling

Los Angeles.—Considerable new interest is being shown in West Montebello extension of old Montebello field since recent completion of Union Oil Company's Calkins 1 at 7160 feet for 1600 barrels of 35-gravity oil through a 37/64-inch choke. Active drilling is in progress on the part of several operators holding offset acreage, and new wells at West Montebello are occupying a prominent part of the state's weekly completion list.

Superior Oil Company will use an exceptionally heavy rig in drilling an outpost on the Moodie lease in North Rio Bravo field, Kern County. Successful completion will require offset drilling by Union Oil Company.

Two wells are drilling in the new Coles Levee field, also in Kern County, to determine whether Ohio Oil Company's discovery well merely touched the top of the Stevens zone, an opinion which has been held by certain geologists. Ohio's second well already has picked up the shallower zone, while Union Oil Company's wildcat in Section 11-31-25 is nearing critical depth in coring below 9300 feet.

Wilmington, Long Beach harbor area, reported one of its largest recent completions when Universal Consolidated Oil Company's Newport 7 was brought in for 1600 barrels of 25-gravity oil from Lower Terminal sand at 4208 feet, an event which is expected to cause additional drilling.

The City of Long Beach has been filling in the ocean front property, making it possible to stake more locations. Most of the drilling immediately scheduled for the harbor district will call for directional holes, whipstocked to tap the pay zones.

Reports are The Texas Company's wildcat at the southwest corner of Anaheim, Orange County, has cored 40 feet of oil sand between 8200 and 8250 feet.

CALIFORNIA Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Los Angeles County—		
Isco Pet. Co., Rosecrans-Abel 2 (Athens-Rosecrans), Lot 1, Gardena Heights Tr.	850	7737
Union, Rosecrans 28 (Athens-Rosecrans), 165 ft southerly and 729 ft westerly of C/ls Rosecrans and Broadway	672	7735
Brea Canyon, No. 49 (Brea Canyon), 275 ft s and 638 ft e of nw cor	72	4891
Shell, Reyes 12 (Dominguez)	366	4179
Southwest Exploration, State 8 (Huntington Beach), 154 ft n and 2832 ft w of C/ls Ocean and 23rd st.	285	4372
Pontrantz Pet. Co., Newmark 1, (Montebello), 760 ft southwesterly from c/l Lincoln and 1050 ft northwesterly from c/l Maple	45	6710
Standard, Braun 2 (Montebello), 600 ft southerly and 810 ft westerly from c/ls Lincoln and Maple aves	oil	6735
Union, Calkins 1 (Montebello), 165 ft easterly on Lincoln from c/l Montebello blvd.	1400	7160
General, Foggi 13 (Torrance Extension), 340 ft easterly on c/l Lomita blvd., from c/l Vermont thence 255 ft northerly at r/a	299	5192
W. E. McCaslin, Springman 1, (Torrance Extension), 165 ft n and 190 ft e of ne corner of 238th st.	370	5170
Pacific Western, Marble Fee 12, (Torrance Extension)	248	4932
Whittier-Santa Fe Springs No. 1 (Torrance Extension)	985	5181
General, Harbor Comm. LB 32 (Wilmington)	432	4060
Padreson Oil, No. D-55-1 (Wilmington)	100	3662
Sonwell Oil Co., Sonwell (LB) 5 (Wilmington)	580	4015
Kern County—		
Standard, Jewett 1, (Arvin), 990 ft s and 990 ft w nec 16-31-29	3600	6270
Standard, No. 31 (McKittrick), 220 ft s and 220 ft w nec 7-30-22	90	2240
Shell, KCL B-6-30 (Ten Section), 1654 ft n and 364 ft e swc 30-30-26	415	8200
Ventura County—		
Chanslor-Canfield Midway, No. B-24, (Rincon), 646 ft s and 37 ft e of nwc 16-3-24	130	4660
Rincon Dev. Co., Permit 82-3 (Rincon), 2600 ft s and 225 ft w nec Permit 82	•	2105

• Failures; † Junked; ¶ Million cu. ft. gas.

Michigan Activities

Four wildcats showing Traverse lime production

Mt. Pleasant, Mich.—Four wildcats showing Traverse oil production continued under test this week in Southwestern Michigan as the bulk of 28 completions in the state were registered in shallow fields.

Newest wildcat to show possible commercial production is Detroit-Allegan Oil Company's County Farm 1, NW SW SE 5-2n-13w, Allegan County. Traverse lime came in at 1549 feet with a pay at 1554 feet and the hole bottomed at 1556 feet. Bailer tests showed about 100 feet of fluid and first attempts to acidize with 250 gallons were not successful.

Blood & Hendershott's Jackson 1, NE NE NE 29-2s-16w, Bangor Township, Van Buren County wildcat, swabbed and flowed 148 barrels of oil with about 15 percent water cut. Possibility is that the water is coming from above the pay. Traverse was topped at 1002 feet and bottomed with a hole full of oil at 1208 feet for test.

Clapsaddle & Harris' Benn 1, NW NW NE 24-1s-15w, Van Buren County, where oil saturation in Traverse lime at 1160-62 feet has been under test for three weeks, appeared to have cemented off all or part of the pay when casing was cemented after drilling into oil saturation. So far production tests have not proven satisfactory although before casing was run the well had flowed between 120 and 160 barrels.

Sprenger Brothers' Schafter 1, Section 14-3n-13w, Monterey Township, Allegan County, another promising wildcat, is pumping between 10 and 20 barrels per day from 1736 feet.

With two more offset producers completed, ranging up to 240 barrels per day natural, making four wells in all, the Walker pool, Kent County, appears to be in line for a brisk drilling play this spring. Wells are producing from Traverse lime at depths of about 1700-1800 feet. All the wells drilled have shown gas estimated up to a million feet and oil around 2 to 10 barrels per day in the Berea around 1100-1200 feet but this zone is being passed up for the present.

Gulf Refining Company was ready to drill ahead this week after spending about four weeks testing a Monroe lime oil pay at 3530-59 feet on the Bateson 1, Section 2-14n-4e, Monitor Township, Bay County. This zone averaged around 110 barrels per day following acid treatment and a 290-quart nitro shot.

Although it did not add any appreciable new territory, a new well in the Freeman pool, Clare County, rated at 6000 barrels potential natural, set a flow record for the field. Barlow 1, drilled by C. L. Maguire, Inc., on a Carter Oil Company farm-out, flowed wild for several hours and was gauged at 250 barrels per hour while an unchecked amount of oil was going into pits from a 2-inch bleeder pipe. The test offset a 500-barrel well on the west and a 100-barrel well on the east. It is producing from the Monroe at 3999 feet.

Considerable interest is now centered on Michigan Devonian Petroleum Company's DeKoch 1, SE NE SE 22-5n-13w, Jamestown Township, Ottawa County, a wildcat, this week drilling at 540 feet. Several companies are reported contributing in the cost and hold acreage in the block which was geophysically surveyed last fall. Seismograph work has picked up considerable the past year in Michigan but few wells have been drilled on seismograph highs. No discoveries have been attributed to seismograph exploration.

MICHIGAN Completions

Company, Well and Location	Init. Prod. Bbls.	Depth
Allegan County—		
Earl W. Morris, Seeley 1, ne ne se 24-1n-14w	•	1372
Muskegon Oil Corp., Sutter 1, nw nw nw 11-4n-13w	1200	1599
Arenac County—		
Sterling Dr. Co., Heltzel 1, se ne nw 26-19n-3e	120	3002
Clare County—		
C. L. Maguire, Barlow 1, ne nw se 3-18n-6w	6000	3899
McClanahan Oil Co., Van Horn 1, sw ne ne 3-18n-6w	500	3904
Basin Oil Co., Van Horn 4, sw ne ne 4-18n-6w	750	3916
Pure, Switzer 3, c s sw sw 27-19n-6w	150	3909
Bicknell B4, c n se se 28-19n-6w	528	3903
Kent County—		
Wolverine, Orlik 1, nw ne nw 5-6n-12w	132	1861
Muskegon County—		
W. Mich., Ackerman 1, c ne 4-9n-14w	¶	1262
Ogemaw County—		
Weber Oil Co., Crawford 7, se ne se 28-22n-2e	100	1760
Ottawa County—		
Robt. C. Lentz, Palambos 1, nw ne se 29-5n-14w	•	1500
St. Clair County—		
Lee Brown, Metcalf 1, nw ne nw 6-7n-17e	•	733
Van Buren County—		
W. J. Soverign, Bank 1, ne nw sw 11-2s-16w	•	1108
O. O. Borden, Stewart 1, se se ne 7-1s-14w	75	1219
Thompson et al, Carmichael 1, sw ne sw 8-1s-14w	975	1209
Fisher & McCalls, Melvin 1, sw se sw 8-1s-14w	190	1206
Fowler, Tr., Melvin J2, ne sw se 8-1s-14w	448	1204
D. F. Jone, Pease 1, se nw se 8-1s-14w	•	1249
H. Leman, Rogers 1, sw sw nw 8-1s-14w	25	1227
R. T. & E., Beach 1, sw sw nw 16-1s-14w	260	1226
E. G. Alexander, Lindsley 1, nw sw nw 16-1s-14w	225	1208
T. H. Ferguson, Wallace 1, sw sw nw 16-1s-14w	96	1208
H. B. Cannon, Babcock 1, nw nw nw 17-1s-14w	500	1211
Bridger Basin, Meek 3, nw sw ne 17-1s-14w	300	1236
Fred J. White, Florian 1, sw nw sw 5-1s-15w	•	1206
Guy M. Obenauer, Vought 4, nw ne se 32-4s-14w	lcn.	abnd.
Cecil Steele, Uininn 1, sw nw sw 5-1s-13w	•	1315

• Failures; † Junked; ¶ Million cu. ft. gas.

WILDCAT REPORT
New Starts and Completions

ARKANSAS

FIRST REPORTS

Columbia County—Phillips Pet. Co., Askey 1, c ne nw 4-17-21, moving in materials (Permian test).

Union County—Oliphant Oil Co.'s Union Sawmill Company 1, c sw nw 22-19-14, lcn (Permian test).

COMPLETIONS

Mississippi County—Benedum & Trees Oil Co., Winston Mack 1, sw nw sw 3-15n-12e, top Nacatoch 2160 ft, Paleozoics 2800 ft, abnd 4250 ft.

CALIFORNIA

FIRST REPORTS

Los Angeles County—C. W. Partridge's Hillside 1 (Whittier area), 100 ft s and 750 ft w of ne c se nw 22-2-11, rigging up.

Kern County—Trico Oil & Gas Co.'s Olcese 1 (Round Mountain area), 1430 ft n and 820 ft w se c 17-28-29, foundation. Trico Oil & Gas Co.'s T & G 1, 335 ft s and 1655 ft w nec of se¼ Sec 2-25-23, location.

Santa Barbara County—Hogan Petroleum Co.'s Zabala Core Hole 3 (Bicknell area), 5875 ft westernly on north property line from ne c, thence 142 ft southerly at r/a, Sec 33-9-34, lcn.

COMPLETIONS

Standard Oil Co.'s Jewett 1 (Arvin) nec 16-31-29, for 3600 bbls, 6270 ft.

Hogan Petroleum Co.'s Zabala Core Hole 2 (Bicknell), sec 33-9-34, abnd 1000 ft.

ILLINOIS

FIRST REPORTS

Clay County—Oil Well Drilling Co.'s H. V. Shahan 1, sec sw 9-5n-5e, Larkinsburg tnp, dr.

Madison County—Pennsylvania-Illinois Oil Co.'s Hurlbrink 1, ne ne ne 19-4n-8w, dr.

White County—Price and Massey's Higgins 1, nw nw ne 22-4s-10e, moving in materials. Arab Petroleum Corp.'s (Bob Garland), Fee 1, ne nw 35-6s-10e, Emma tnp, 10 mi southeast of Carmi, moving in materials.

COMPLETIONS

Brown County—Ripley Oil Trust's P. Reich 1, nw sw se 15-1s-2w, Cooperstown tnp, top Niagaran 605 ft, abnd 642 ft.

Jefferson County — Pyramid Petroleum Corp.'s Troutt 1, c sw se se 19-2s-2e, Shilo tnp., top St. Louis 2589 ft, abnd 2595 ft.

Washington County—Pitfer's Hafer 1, se sw sw 22-1s-1w, top Pedro 714 ft, abnd 763 ft with salt water in Pedro.

Wayne County — Thompson Drilling Co.'s Briscoe 1, sw sw nw 21-2n-7e, Bedford tnp, abnd 3172 ft, salt water in McClosky.

INDIANA

FIRST REPORTS

Gibson County — A. J. Walker's Oscar Schmidt 1, c se sw 13-3a-9w, Barton tnp, 1¼ mi east of Mackey, lcn. Will be carried to McClosky at about 2000 ft.

KANSAS

FIRST REPORTS

McPherson County—Sinclair Prairie & Hurley's Martins 1, cwl sw 20-21-3w, dr.

COMPLETIONS

Barton County—Skelly Oil Co.'s Gage 1, sec sw 35-16-13w, s of Susank pool, top Topeka 2705 ft, top Lansing 3074 ft, td 3382 ft, pb 3260 ft, 94 shots 2903-2929 ft, acidized 7000 gals, completed, 451 bbls, gr 35.7.

NORTH LOUISIANA

FIRST REPORTS

Caldwell Parish—Critchett & Woods' Kyles 1, ne sw ne 18-11n-3e, spd.

Sabine Parish—Geo. Ellis et al's Walker 1, 500 ft s and 330 ft e nwc nw se 8-4n-12w, spudding.

SOUTH LOUISIANA

FIRST REPORTS

Jefferson Davis Parish—Union Sulphur's Hebert Tietje 1, 330 ft out of nwc section 37-7s-4w, South China area, lcn.

COMPLETIONS

Orleans Parish—W. T. Burton's State 1, Lake Pontchartrain, 13e-10s, dr to 11,149 ft, stuck dr pipe, pb and tested 8153 ft, recovered salt water, abnd.

St. Martin Parish—The Texas Co.'s St. Martin Land Co. 11, 1550 ft s and 1000 ft w of St. Martin Land Co. 1, Section 21-8s-7e, dr to 9404 ft, salt, topped 8904 ft. 7-in csg at 8912 ft, perforated 8060 to 8070 ft, showed oil and water on drill stem test, failed to flow, abnd. Continental's Standard of Kansas 1, n of St. Martinville, 138-10s-6e, abnd 8248 ft.

St. Bernard Parish—William Helis' Nunez 1, Chalmette area, 34-12s-12e, abnd 9634 ft.

STATE	WILDCATS STARTED		WILDCAT TESTS COMPLETED							
			Total		Oil		Gas		Dry	
	This Week	This Year	This Week	This Year	This Week	This Year	This Week	This Year	This Week	This Year
Alabama	...	1	...	1	...	...	...	...	...	1
Arkansas	2	6	1	5	...	...	...	...	1	5
California	4	47	2	20	1	8	...	...	1	12
Illinois	4	72	4	32	...	3	...	...	4	29
Indiana	1	6	...	...	...	...	...	...	...	...
Kansas	1	27	1	26	1	9	...	...	...	17
Kentucky	...	1	...	3	...	2	...	...	...	1
Louisiana	3	23	4	20	...	4	...	...	4	16
North Louisiana	2	9	...	6	...	1	...	...	...	5
South Louisiana	1	14	4	14	...	3	...	...	4	11
Michigan	2	33	5	54	...	3	...	...	5	51
Montana	1	...	...	...	...	...	...	...	...	...
Mississippi	...	1	...	1	...	...	...	...	...	1
Missouri	...	1	...	...	...	...	...	...	...	...
New Mexico	2	6	...	1	...	1	...	...	...	...
New York	...	...	...	2	...	...	...	1	...	1
Oklahoma	4	31	2	28	1	4	...	1	1	23
Ohio	...	...	...	3	...	1	...	...	...	2
South Dakota	...	1	...	...	...	...	...	...	...	...
Texas	14	162	17	163	1	18	...	1	16	144
East Texas	2	18	...	9	...	...	...	...	...	9
North Texas	...	10	7	42	1	10	...	1	6	31
Gulf Coast	1	20	2	13	...	1	...	...	2	12
Panhandle	...	2	...	1	...	...	...	...	...	1
South Texas	7	73	5	70	...	6	...	...	5	64
West Texas	4	39	3	28	...	1	...	...	3	27
Utah	37	...	32	...	4	...	...	...	28	...
Wyoming	...	1	...	...	...	...	...	...	...	...
Total U. S.	38	419	36	349	4	53	...	3	32	293

MICHIGAN

FIRST REPORTS

Allegan County—D. D. Battjes' Speet 1, ne ne se 2-4n-16w, spd.

Van Buren County — R. A. T. Wright's Young 1, nw sw nw 16-4s-15w, spd.

COMPLETIONS

Allegan County—Earl W. Morris' Seeley 1, ne ne se 24-1n-14w, Cheshire Township, abnd 1372 ft.

Ottawa County—Robt. Lentz's Palambos 1, nw ne se 29-5n-14w, abnd in Traverse 1500 ft.

Van Buren County—W. J. Soverign's State Bank 1, ne nw sw 11-2s-16w, Bangor Township, top Traverse lime 1006 ft, sw 1026 ft, abnd 1108 ft. Fred J. White's Florian 1, sw nw sw 5-1s-15w, Columbia Township, top Traverse 1149 ft, sw 1156 ft, abnd 1206 ft. Cecil Steele's Uninn 1, sw nw sw 5-1s-13w, Pine Grove Township, abnd 1315 ft.

Natural gasoline output shows slight decline

Washington.—Natural gasoline production in December averaged 5,887,000 gallons a day, compared with 5,942,000 gallons in November, and total production for the month was 182,490,000 gallons against 178,248,000 gallons in November, it was reported February 10 by the Bureau of Mines.

The lower production, it was explained, was due to decreases in a number of fields, particularly the Oklahoma City and Kettleman Hills fields.

Total output of natural gasoline for the year was placed by the bureau at 2,113,314,000 gallons, compared with 2,065,434,000 gallons in 1937, the daily average production being 5,790,000 gallons last year against 5,659,000 gallons the year before.

Stocks continued to decline during December, the bureau reported, and dropped 38,304,000 gallons during the month to a total of 202,860,000 gallons December 31. This, however, it was said, was 3,024,000 gallons over the stocks of December 31, 1937. At the close of the year, 125,832,000 gallons were held at refineries and 77,028,000 gallons at plants and terminals.

MONTANA

FIRST REPORTS

Glacier County—Morton & Cloutier's Hagan 1, ese se 5-31n-7w, 8 mi west Cut Bank field, rigging cable tools.

NEW MEXICO

FIRST REPORTS

Guadalupe County—Jack Manly et al's Agua Ranch 1, c ne nw 33-8n-21e, sp and sd.

Lea County—P. B. English et al's Miller 1, c ne se 18-19s-32e, dr 310 ft.

OKLAHOMA

FIRST REPORTS

Garfield County—Continental Oil Co.'s Luedtman 1, c sw se 2-21-4w, lcn.

Pontotoc County—L. Walker's King 1, sw se nw 5-4n-7e, dr.

Seminole County—Atlantic Refining Co. & Turman Oil Co.'s Jimmey 1, se nw ne 21-7n-6e, lcn. Burke-Greis' Harjoche 1, nec sw 19-8n-7e, dr.

COMPLETIONS

Lincoln County—Fields & Nagle's Black 1, sec 31-16n-6e, 1 mi n Skellyville pool, otd 3903 ft, top Mayes 3860 ft, td 3980 ft, 40 bbls.

Payne County—Comail Oil Co.'s Curran 1, sec 21-19n-6e, s Yale-Qua pool, top Bartlesville 3090 ft, top Wilcox 3546 ft, abnd 3606 ft.

EAST TEXAS

FIRST REPORTS

Freestone County—A. J. Willis et al's W. W. Craig 1, 660 ft from se and 330 ft fr ne lines of 58¾-acre tract, G. Teas sur, 8 mi n Fairfield, dr 1200 ft.

Leon County—Humble and Sun's E. F. Swift 1, 450 ft from m/e/ne line and 406 ft fr nw line of 1300-acre tract, H. W. Sublett sur A-779, 4½ miles nw of Navarro Crossing field, rigging up.

NORTH TEXAS

COMPLETIONS

Archer County—Bridwell Oil Co.'s J. S. Bridwell 2, 1650 ft out of nwc sec 8, blk 5, Clark-Plumb sub-div, abnd 1877½ ft. Eph Griffin et al's L. F. Wilson 1, 2080 ft fr n

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17 sections,	11,250 acres.....	17,500.00
15 sections,	9,640 acres.....	25,000.00
15 sections,	9,480 acres.....	21,000.00

Smaller ranches

E. M. BRICKLEY AND CO.
Carrizozo, Lincoln County, New Mexico

and 330 ft fr e lines of sec 128, ATNCL-A. Nail sur A-325, trace oil in sand 4065-90 ft and in broken sand and shale 4490-4517 ft, abnd.

Baylor County—Petroleum Producers Company's Portwood 1-L, 150 ft fr n and 1083 ft fr w lines sec 1575, TE&L Co. sur, trace oil 1369-77 ft, abnd 1500 ft.

Clay County—H. S. Grace et al's F. C. Hunt 1, 450 ft out of nwc sec 135, Byers Bros. subdiv, abnd 1503 ft.

Cooke County—Fred Snuggs et al's A. L. Lewis-Texas Co, 1, 1475 ft fr n and 150 ft fr e lines of W-38-acre of J. H. Ing sur A-1615, abnd in w.s. 1809-21 ft.

Jack County—R. D. Compton et al's Robt. Wilson 1, H. H. Fuquay sur A-217, o.s. 384-86 ft, pumped 18 bbls oil initial.

Throckmorton County—M. G. Cheney et al's B. H. Richards 1, 330 ft fr n and 2000 ft fr w lines sec 2367, TE&L Co. sur, top Barnett shale 4557 to 4631 ft, top Mississippian lime 4631 ft, abnd 4680 ft.

TEXAS GULF COAST

FIRST REPORTS

Brazoria County—Hamman Exploration Co.'s Darrington State Farms 1, nw of Sandy Point field, 1400 ft out of NWc of 821-ac tract, A. McFarland sur, lcn.

COMPLETIONS

Harris County—Cron & Gracey's R. D. McDonald 1, Huffsmith area, 330 ft s of n line and 330 ft w of e line of lease in A. Lawson sur, Hockleyensis 4711 ft, Cockfield 5545 ft, salt water sand 5810 ft, abnd 6100 ft.

Orange County—Sun's Lutcher Moore 1, Echo area, 836 ft n of s line and 928 ft w of e line of tract in lot 16, B. Johnston sur, topped Discorbis 6245 ft, Heterostegina 6756 ft, Marginulina 6967 ft, Frio 7382 ft, dr to 9705 ft, pb and tested 9010 ft, showed salt water, tested 6330 ft, showed salt water, abnd.

WEST TEXAS

FIRST REPORTS

Hockley County—The Texas Co.'s Mallett Land & Cattle Co. 1-C, 440 ft out of nec labor 11, league 51, Scurry County School Lands, rigging rotary.

Jones County—Forest Dev. Corp.-Carl King Drl. Co.'s First Nat'l Bank (Anson) 1, 330 ft out of nwc sec 8, Orphan Asylum Lands, moving in materials.

Pecos County—Mid-Western Pet. Co.'s Mattei 1, 330 ft out of nec H&GN sec 64, blk 8, cem sur pipe, A. Leidecker & Cain's Lehn-Texas Co. 1, 330 ft fr ne and se lines of H&GN sec 71, blk 10, rig.

COMPLETIONS

Brewster County—H. D. Wilcox et al's W. H. Kokernot 1, 350 ft fr w and 1760 ft fr s lines sec 12, blk C, J. V. Massey sur, abnd in shale 2330 ft.

El Paso County—Tri-State Oil Co.'s L. M. Kinkel 1, 190 ft fr n and 550 ft fr e lines sec 237, S. F. No. 7232, elev 3977 ft, trace o&g 1225-40 ft, sand 1752-90 ft and in lime 3359-72 ft; trace free oil 3495-3500 ft, abnd 3571 ft.

Nolan County—Union Oil Co. (Cal.)'s J. D. Pepper 1, 330 ft out of nec T&P sec 57, blk 21, elev 2204 ft, top Noodle Creek lime 3350 ft, abnd 6011 ft.

SOUTH TEXAS

FIRST REPORTS

Duval County—H. R. Cullen and John Mayo, Hoffman 1, 8800 ft s, 466 ft e of nw cor of lse out of 3728-ac tr, Jose Rafael Gravia Salinas " San Leandro" gr, lcn.

DeWitt County—Marshall Purvis et al, Afflerbach 2, 980 ft w nw cor A. Kozak tr, but in Afflerbach 287-ac tr, I. V. Criscell survey No. 44, lcn.

Guadalupe County—Diamond-Half Oil Co., Jacobs 1, 150 ft ne line, 150 ft nw line of 44.75-ac, Ben Fuqua ¼ Lge, lcn.

Starr County—C. L. Foster, Garza 1, 330 ft s, 330 ft e line of n½, lot 7, Danewood sub division, Juris of Mier, lcn. A. E. Henninger, Guerra 1, 3353 ft ne line, 227 ft se line, 160-ac tr, Por. 56, Jurisdiction de Mier gr, lcn. Whitfield and Southers, Bennett 1, 330 ft n line, midway between e and w lines of tr 182, Por. 90, Juris de Carmargo gr, lcn.

Webb County—Joe M. Hardie, Garcia 1, 330 ft n line, 330 ft w line of ne¼ of blk 27, Los Ojuelos grant, lcn.

COMPLETIONS

Bexar County—J. Joe Wagner et al, Lamm 1, 500 ft s line and 350 ft w line of 200-ac tr, Manuel de Luna sur No. 3, abnd 1002 ft.

Duval County—Hamill & Smith, Perez 1, 330 ft s'ly s line, 330 ft e'ly w line of n 125 ac of 2120 ac tr, Perez heirs, Francisco Cordente "Santa Cruz de Concepcion" gr, abnd 3114 ft.

Guadalupe County—Edgar Weyel et al, Schraffl 1, 150 ft sw line, 500 ft nw line of 300-ac tr, K. B. White and U. Micheli sur, abnd 756 ft.

Nueces County—O. W. Killam, Chapman 1, 100 ft e line, 467 ft s line, sec 106, Laureles Farm Tracts, Ramon de Ynojosa gr, abnd 7012 ft.

Williamson County—Fritz Fuchs, Schmidt 1, 1050 ft w line and 750 ft s line 161.9-ac tr, J. West sur, abnd 1400 ft.

The AVIATOR PLAYS SAFE WITH A PARACHUTE

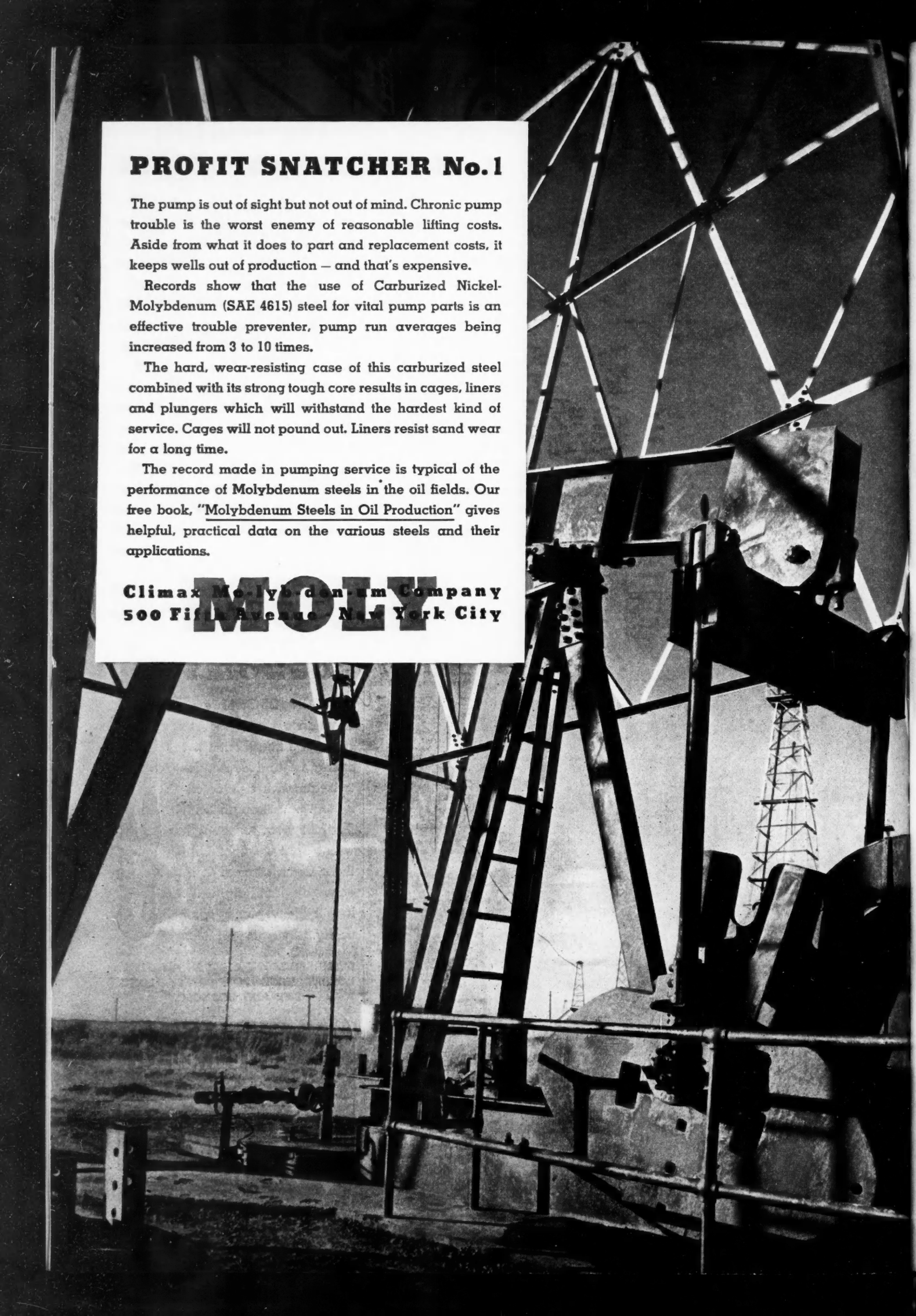
. . . not because of lack of faith in his plane . . . but as a safety precaution against unforeseen failure. Even though you have never had a Rotary Hose failure in all your drilling experience . . . take a tip from the Aviator and **play safe** with CHIKSAN **All-Steel** Rotary Hose.

SAFETY with ECONOMY

CHIKSAN All-Steel construction assures uniform strength throughout . . . strength that does not deteriorate with age or climate . . . strength with flexibility . . . strength with light weight. All these mean economy . . . ease of handling . . . longer life . . . plus greater safety.

STANDARDIZE ON CHIKSAN ALL-STEEL ROTARY HOSE FOR SAFETY, LONG LIFE AND ECONOMY

CHIKSAN OIL TOOL CO., LTD.
FULLERTON, CALIFORNIA
HEAVY DUTY REAMERS
STANDARD REAMERS
THREE-WAY DISC BIT
CIRCULATING HEADS
MUD GUNS
BALL BEARING SWING JOINTS for ALL PURPOSES



PROFIT SNATCHER No. 1

The pump is out of sight but not out of mind. Chronic pump trouble is the worst enemy of reasonable lifting costs. Aside from what it does to part and replacement costs, it keeps wells out of production — and that's expensive.

Records show that the use of Carburized Nickel-Molybdenum (SAE 4615) steel for vital pump parts is an effective trouble preventer, pump run averages being increased from 3 to 10 times.

The hard, wear-resisting case of this carburized steel combined with its strong tough core results in cages, liners and plungers which will withstand the hardest kind of service. Cages will not pound out. Liners resist sand wear for a long time.

The record made in pumping service is typical of the performance of Molybdenum steels in the oil fields. Our free book, "Molybdenum Steels in Oil Production" gives helpful, practical data on the various steels and their applications.

Climax Molybdenum Company
500 Fifth Avenue New York City

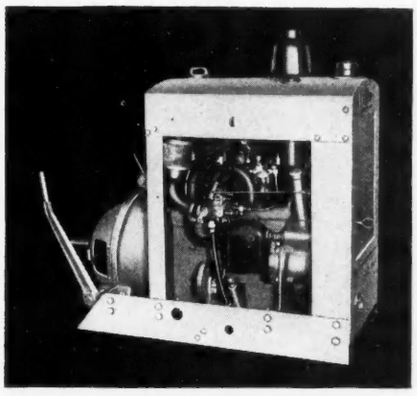
MOLY

NOTES FOR THE Equipment Buyer and User

Pumping Engines
LE ROI COMPANY

Supplementing its line of larger sized valve-in-head pumping engines, Le Roi Company of Milwaukee has recently announced a new line of small "L" head units built for shallow field work.

These engines are available in three sizes for pump loads ranging from 2½ to 15 horsepower. Load ratings are based on unusually low piston speeds of 700 to 800 feet per minute.



Le Roi Four-Cylinder Model, for 6- to 9-horsepower loads.

Especially designed for oil field service Le Roi pumping engines have many features not found on the ordinary industrial engine. Of particular interest on the unit illustrated is the heavy duty Twin Disc oil field type clutch and power take-off and the extra large bell-housing enclosing a flywheel nearly twice as heavy as those used on other engines of comparable size—an important factor in the unusually smooth operation of Le Roi pumping engines.

Diesel Engine
MURPHY DIESEL COMPANY

Murphy Diesel Company, Limited, Milwaukee, Wisconsin, announced a new 200-horsepower Diesel engine, known as ME-650.

The design of this engine conforms to that of the standard Murphy Diesel Model ME. Injection is direct into a plain symmetrical combustion chamber. Injector and fuel pump are combined in one unit which is easily and quickly removed and replaced. There are no high pressure fuel lines and injectors cannot become air bound.

Special care has been taken to assure cool operation and pistons are oil cooled under pressure.

Four valves are provided for each cylinder, assuring maximum breathing capacity and rapid scavenging. Should the oil pressure drop below a fixed minimum pressure, the engine automatically shuts itself off. Control is through a single lever which permits easy and simple toggling-in for remote control.

The design of the new Murphy engine is simple and compact, and all parts are easily accessible.

The ME-650 can be had either as a bare engine or with radiator and full enclosure. Skids, outboard bearings, and direct connected generator units are also available.

Tubing Slip and Bowl
KINZBACH TOOL COMPANY

Kinzbach Tool Company, Houston, now offers the new Kinzbach-Ajax Tubing Slip and Bowl, which features a four-piece unit-type slip construction and other improved points of design. All parts are of high grade alloy steels.

The bowl is gated in the side to permit its being placed around the pipe without breaking the connections. The gate block fits into a grooved slot and locks with a bolt, assuring a perfect fit. The upper flange on the bowl is wide enough to serve as a shelf for the slips when not engaging the pipe. The lower flange is squared to allow the bowl to set in the square of the rotary table when running tubing with the rotary in place.

Of particular advantage is the feature of interchangeable inserts accommodating both 2-inch and 2½-inch tubing by changing inserts of the same set of segments. The slip handles are long enough to keep the operator's hands clear of the elevators. A link is provided for locking the slip around the pipe. The segments are cored to permit drain of the fluid back into the hole. The slips cannot cut, mar or bottleneck the pipe, and will give long, dependable service, the manufacturer claims.

Kinzbach-Ajax Tubing Slip and Bowl

Electric Hoist
WRIGHT MANUFACTURING DIVISION

The Speedway, a light weight low cost wire rope Electric Hoist, has been added to their present line by Wright Manufacturing Division of American Chain & Cable Company, Inc., York, Pennsylvania.

Hoisting capacities range from 250 pounds to 750 pounds and hoisting speeds 15 feet to 43 feet per minute. The Wright Speedway Electric Hoist standard construction includes fully enclosed ball bearing motor, anti-friction bearings, cut alloy steel spur gears, multiple disc solenoid brake, push-button control, preformed hoisting cable and many other quality features which make it suitable for production service.

Made in three types for lug suspension, hook suspension or mounted on trolley. Details will be sent on request.

Boiler Scale Remover
THE NORTH AMERICAN FIBRE PRODUCTS COMPANY

The North American Fibre Products Company, Keith Building, Cleveland, Ohio, announces the Mogul Ever Clean Boiler Process, an improved colloidal product, use of which it claims effects economical removal of scale in high-pressure boilers. The company will send an informative booklet "Balance," which deals with feed water problems, upon request.

Inhalator
DAVIS EMERGENCY EQUIPMENT

A new inhalator, which, it is claimed, has improvements that greatly increase the usefulness of this instrument for treating cases of gas poisoning, is announced by Davis Emergency Equipment Company, 55 Van Dam Street, New York.

This new Davis inhalator is so designed that it can be used with compressed oxygen tanks of three different capacities without the need for special adaptors, thus fitting it for treating different kinds of cases, according to the manufacturer. For ordinary emergency work, two 16 cubic foot cylinders containing a mixture of oxygen and carbon dioxide are carried in the inhalator case, ready for immediate use. If an additional supply is needed, a 50 cubic foot tank can be connected directly to the pressure-reducing valve of the instrument. If further treatment in the hospital is required, the pressure-reducing valve can be directly attached to a standard 220 cubic foot tank.

Another feature claimed for the Davis inhalator is that breathing bag, pressure-reducing valve, and cylinders can be removed from the case and the bag placed close to the patient. This allows the gas intake and the patient to be under close observation at the same time, and also permits the bag to be laid conveniently on stretcher, ambulance seat, or hospital bed.

A second face piece can be carried

Standco
NO-SMOKE
STANDCO BRAKE LINING
Nothing novel—no bunk—but it gets the job done without scoring brake rims. See page 2100, Composite Catalog.
Standard Brake Lining Co.

BARGAINS
in first class used Oil Field Machinery of all kinds.
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Highest prices paid for
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MIOCENE STRATIGRAPHY OF CALIFORNIA
By ROBERT M. KLEINPELL
This Work Establishes a Standard Chronologic-Biostratigraphic Section for the Miocene of California and Compares It with the Typical Stratigraphic Sequence of the Tertiary of Europe.
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NOTES FOR THE Equipment Buyer and User

in the case and attached directly to the breathing bag without supplemental equipment, so that two victims can be treated at the same time.

The pressure-reducing valve and the pressure gauges used in this inhalator are approved by the Underwriters' Laboratories.

Sullivan Machinery Company Elects New President

Frederick W. Copeland has resigned the presidency of H. Channon Company, Chicago, to become president of Sullivan Machinery Company.

Copeland previously was connected with Sullivan Machinery Company, having joined the organization in 1913. In the 21 years which followed, he worked successively as apprentice in each plant, service man in the mines, salesman, export manager, vice president and controller. He has been a director since 1923. In 1934 he left to become president of H. Channon Company. His father, the late Frederick K. Copeland, served as president of the company from 1892 to 1928, the interval during which the company grew from a capitalization of $275,000, 1 sales office and 1 small factory, to an approximate capitalization of $10,000,000, 31 branch offices and 2 plants occupying 1,036,000 square feet.

Texas Iron Works Appoints Wittich for International Sales

Val R. Wittich, Jr., who maintains headquarters for his foreign sales organization at 30 Rockefeller Plaza, New York, has been appointed as export sales representative for Texas Iron Works, Inc., Houston, Texas.

VAL R. WITTICH, JR.

Gould in Charge of Continental Motors Branch at Dallas

Fred T. Gould recently has been placed in charge of Continental Motors Sales and Service Company, 2824 Main Street, Dallas, Texas. This company is a subsidiary of Continental Motors Corporation, Detroit, Michigan, and handles that company's product throughout the Mid-Continent oil area.

FRED T. GOULD
Continental Sales and Service Company

Gould is a native of Rochester, New York, and left engineering school to join the army in 1917. After service in France and discharge from the army in 1919, he served an apprenticeship with Brown-Lipe Gear Company and Selden Truck Corporation of Rochester to gain practical engineering knowledge. He later served with Columbia Motor Car Company and Hudson Motor Car Company in engineering and sales capacities. He joined Continental Motors Corporation in the spring of 1925 and served variously in the automotive, industrial, aircraft and the special sales division contacting the government and its agencies.

National Radiator Appoints Two New Representatives

National Radiator Corporation has appointed The Eastern Steam Specialty Company, 125 Barclay Street, New York, representative in the New York City area, and Faville-LeVally Corporation, 140 South Dearborn Street, Chicago, in the Chicago area.

The line of equipment to be handled by these representatives includes National Sections for the condensing and cooling requirements of petroleum refineries and natural gasoline plants, and National Oil-Rators for heating crude oil emulsions and other fluids.

NOTES FOR THE Equipment Buyer and User

Pittsburgh Steel Company Names Exclusive West Coast Distributor

Pittsburgh Steel Company, Pittsburgh, has announced appointment of American Pipe and Steel Corporation, Los Angeles, as exclusive California oil field distributor for Pittsburgh seamless oil country tubular goods, including seamless casing, drill pipe and oil well tubing.

Pittsburgh Steel Company will continue its pipe storage yard at East San Pedro, California, in addition to the Memphis, Tennessee, and Houston, Texas, pipe storage yards. They also will continue the district sales office in the Richfield Building, Los Angeles, with Wallace H. Rowe as district sales manager, and William B. Baylor, field engineer.

Wilkins Will Represent Frick-Reid Supply Corporation in Illinois

H. L. Wilkins, for several years district sales manager of the Central Oklahoma District for Frick-Reid Supply Corporation, has been appointed general district manager in charge of Illinois, Indiana, Kentucky and Michigan territory for the company. He will move from Tulsa to some central location in his new territory.

Wilkins is succeeded by L. R. (Mike) Roberts, who has been appointed district sales manager for the Central Oklahoma district. Roberts had represented the company as field salesman in the Seminole-Wewoka area in Oklahoma for several years.

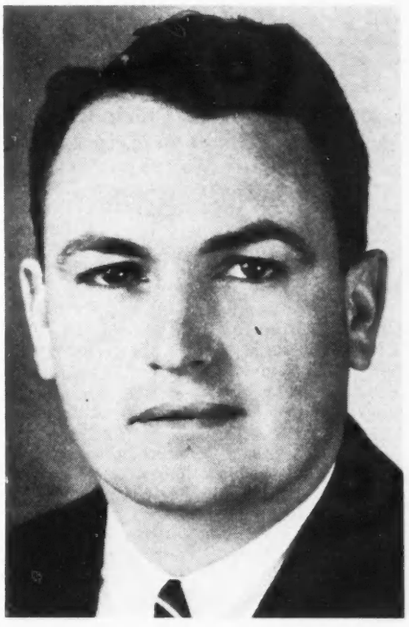
Kapelle Represents Guiberson in Oklahoma and Kansas

M. T. Kapelle, a former member of the field sales staff of The Guiberson Corporation, of Dallas, Texas, has returned to this company's sales organization, and will be in charge of sales in the Eastern Oklahoma and Kansas fields. His home address is 321 South Osage Street, Ponca City, Oklahoma, and The Guiberson Corporation maintains an office at 319 Wright Building, Tulsa.

Hake Tool Company Handling Globe Tools in Mid-Continent

H. W. Hake of Hake Tool Company, Houston, announces the appointment of his company as distributor in the Mid-Continent, Gulf Coast and tributary oil fields, of the entire line of oil field products manufactured by Globe Oil Tools Company of Los Nietos, California.

Both Globe Oil Tools Company and Globe products are well known throughout all domestic and foreign oil fields, the company having succeeded the original H. C. Smith Company, Wieman-Kammerer-Wright (W-K-W) Company, and National Tool and Metals Company, all of Southern California, a number of years ago. The present line of Globe tools consists of rock bits, box and pin type drilling bits, W-K-W drilling bits, basket bits, re-drill bits,



H. W. HAKE
Hake Tool Company

underreamers, rotary core barrels, and other drilling and reaming tools.

Hake plans to leave Houston at once on an extended tour of Oklahoma, Texas, Arkansas, Louisiana, Kansas, Illinois, Kentucky, and Indiana to make personal contacts with operators in those fields; returning in time to arrange an exhibit for his company at the Oil-World Exposition to be held in Houston, April 24 to 29. The company has established offices and warehouse facilities at 1121 Rothwell Street, Houston, where complete stocks of all lines handled will be maintained.

W. K. Mellon Returns To Los Angeles Headquarters

W. K. Mellon, vice president of Petroleum Rectifying Company of California, recently has returned to his office in Los Angeles from a visit of several weeks at the company's Gulf Coast headquarters in Houston, Texas. While there he made several side trips into Arkansas, Louisiana and Oklahoma in company with G. B. Hanson and J. F. Thomas of the Houston office.

Bovaird Supply Company Introducing New Emsco Units

A. C. Stensgaard, salesman and W. L. Ducker, Jr., chief engineer for The Bovaird Supply Company, and George W. Walton, vice president of Emsco Derrick and Equipment Company, Dallas, have returned from a trip through Indiana and Illinois, introducing the new line of Emsco pumping units for which The Bovaird Supply Company is distributor.

This new line of units includes two small sizes adaptable particularly for

For Controlling Low Pressure Wells

BREWSTER Model 3-T Adjustable Flow Bean

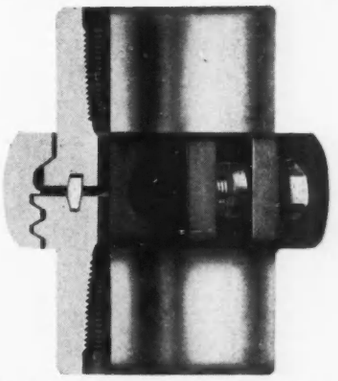
This economical flow bean has been specifically designed for prorating and controlling those wells in low pressure areas. 1" graduated choke fitted with accurate indicator scale. 3000-pound test. Write for prices and special quantity discounts.

The BREWSTER CO., Inc.

Phone 2-3181 Shreveport, La.

New Iberia - Houma - Lake Charles - Rodessa

Red-Rex PIPE UNIONS



QUICK—tightening or loosening a single screw makes or breaks the joint.

EFFICIENT—provides leak-proof joint under both high pressures and temperatures . . . loose thread between hub and nut permits expansion and contraction, and facilitates connecting misaligned members.

ECONOMICAL—rugged construction and renewable parts assure long life of economical service.

Full range of sizes and pressures, in malleable iron and steel

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Export Office:
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Seismograph Surveys
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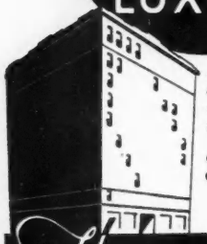
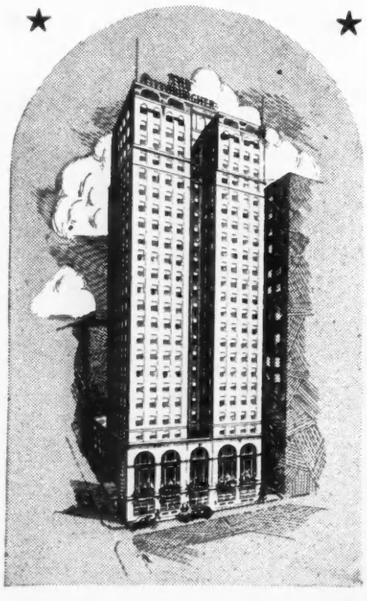
Next time... visit HOUSTON'S HOTEL OF LOW COST LUXURY



- Central Location
- 200 rooms with bath
- Circulating ice water
- Air-Cooled Coffee Shop
- Adjoining garage
- Rates only $2 and $2.50

J. S. MICKELSON, Manager

The SAM HOUSTON
HOUSTON, TEXAS



IN PITTSBURGH

Stop at a new and popular hotel . . . 400 rooms all with outside view, circulating ice water, radio and bath. Excellent restaurants . . . Parking garage.

SINGLES $3 to $4 DOUBLES $4.50 to $6

THE PITTSBURGHER
Knott Hotel Joseph F. Duddy, Mgr.

NOTES FOR THE Equipment Buyer and User

the Illinois and Indiana territories, as well as eight other sizes. These ten sizes are designed in thirty-eight different types to fit all pumping conditions.

J. B. O'Connor, of Clark Bros. Back from European Trip

J. B. O'Connor, vice president and director of sales of Clark Bros., Company, Olean, N. Y., has just returned from a two-month trip abroad during which he visited the various Clark offices and representatives in Europe and the near East.

Much of his trip was made by air, and it included one rather exciting flight of 425 miles over water, at night, in a plane after it had lost its radio antennae and had damaged one wing in an accident incurred while landing at Castelrosso, off the coast of Turkey, for refueling. The pilots decided the damaged plane could safely make the final hop to Tripoli, took off with four passengers, three Englishmen and O'Connor, and completed its trip, landing in Tripoli Harbor without lights but with the help of flares.

Batteries

The B. F. Goodrich Company, Akron, Ohio, has issued a catlogue of its heavy-duty batteries for truck and bus, and Diesel starting engines. Illustrations explain the construction of the battery line, and tables set out complete specifications and plate dimensions on each of the batteries offered for a specific service.

Gasoline Traps

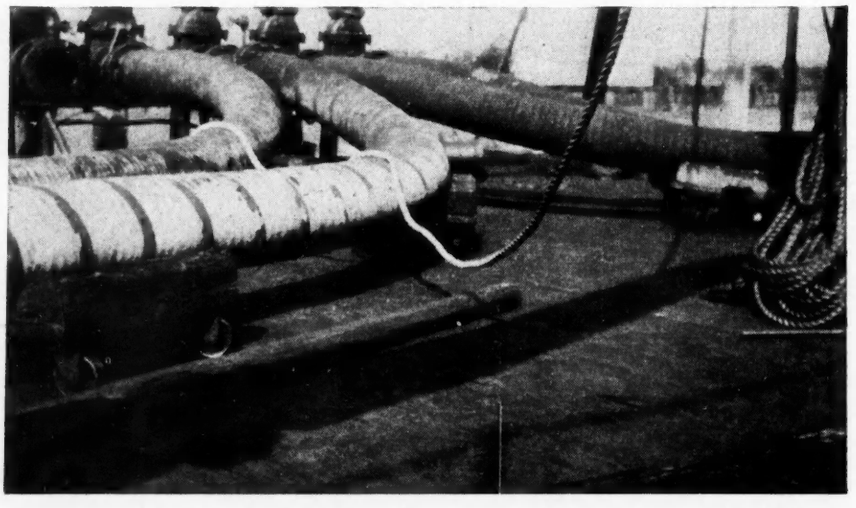
W. H. Nicholson & Company, Wilkes-Barre, Pennsylvania, will provide copies of its Bulletin No. 938 which covers the construction and operation of the gasoline special trap, a float valve intermittent action trap for removing gasoline from accumulators, and for water removal from gasoline lines.

W. R. BROWN

who has been connected with the oil industry the past 20 years has joined Franks Manufacturing Corporation of Tulsa as Oklahoma representative for portable rotary-drilling units, winches, and spudders, it is announced by Carl White, Jr., vice president. Having served as purchasing agent for Ohio Oil Company and in varied capacities with other companies, Brown is experienced in production, pipe line and refining.

Casing Heads

Oil Well Supply Company, Dallas, Texas, has released Bulletin No. 196 briefly explaining and illustrating the features of the Type 38 semi-steel and cast-steel casing head.



The middle hose shown in the photograph is one of two sections of 8-inch Goodrich Type 400 Synthetic Tube Oil Hose which have completed over 5000 hours of service on the docks of a large Texas oil company. During this 5000-hour period these two sections of hose have handled about 22,000,000 barrels of oil. Since they are still in use, further additions to this service record are anticipated.

Squeaks from the Bull Wheel

Not Introduced

"Mandy, tell dat niggah on de yutha side to take his ahm frum 'round yo' waist."

"Tell em yo'se'f, he's a puffick strangah to me."

Too Late

She wanted to be in the beauty chorus, so she wrote an application, enclosed her photograph, and was asked to come for an interview. Imagine her surprise when she was told by the manager that she was too late.

"Is the position filled, then?" she asked.

"No," replied the manager. "I meant that you should have come when you had your photograph taken."

Middleman's Delight

There is a sign on a Georgia highway which reads:

"Don't take your half out of the middle."

How It Started

"There's plenty of time for Lizzie to think of getting married. Let her wait until the right man comes along."

"Why John, I don't see why she should wait. I didn't."

Something Like It

The doctor's new secretary was retyping his records when she came to this—"Shot in the lumbar region."

"Lumbar region?" she pondered. "Oh yes. I know." And wrote down, "Shot in the woods."

Lexicology

"Poppa, what's a millenium?"

"Rastus, dat is de same thing as a centennial, 'cept it's got a lot more legs."

Tact

The passenger on a streamline hailed the porter. "What time do we get to New York, George?"

The porter replied thoughtfully: "We is due in New York at one-fifteen, unless you has set your watch by Eastern time, which would make it two-fifteen. Then, of co'se, if you is goin' by daylight-savings time, it would be three-fifteen, unless we is an hour an' fifty minutes late—which we is."

Optional

New Hired Hand—"Well, boss, what time do I have to git to work mornings?"

Farmer—"Oh, any time you like, jesso's it ain't later'n half past four."

"Sandy" Was Distracted

"Was McTavish's new friend attractive?"

"He said she was so attractive that when he took her home in a cab the other night he could hardly keep his eyes on the meter."

Just a Short Wait

"My dear, the doctor says I must have a change of climate."

"Well, cheer up, honey, spring will soon be here."

Another Lie About Scotland

A Scotsman rang up his doctor and said, "Come at once, ma wee bairn has swallowed a sixpence."

"How old is it?" asked the doctor.

"'Tis a new one."

One Jackass

The jury had been out three days and the vote on a verdict of acquittal was still eleven to one.

"Shall I order the usual twelve dinners for you?" the bailiff asked.

"No," replied the foreman, "make it eleven dinners and a bale of hay."

Altruistic

"Johnnie, what are you doing to Willie to make him cry so loudly?

"I'm just showing him the proper way to eat his cake."

Couldn't Leap

"Did Jerry look around a bit before he married the farmer's daughter?"

"I'll say he did, but every time he did, he looked into the muzzle of that shotgun!"

Give Him Time

A certain maiden lady called in her lawyer and explained the details of her last will and testament.

"I want to give $3000 to the art museum, $1000 to my nephew, $1000 to the Y.W.C.A., and $2000 to the library."

"And what are you going to do with the remaining $500?" he asked.

"I've never had a lover," said the disappointed one, "and I'll give that to anyone who will kiss me and make love to me."

"I'll do it," said the lawyer. He hurried home and explained it to his wife. That night he called at the home of the maiden lady.

Later that night his wife became nervous and called him on the phone.

"It's all right, dearie," he said. "She has cut off the Art Museum and the library and if you'll let me stay a little while longer she'll drop the Y.W.C.A."

Or Vice Versa

Friend: "I see you are driving a new car."

Insurance Agent: "Yes, I tried to sell an insurance policy to an automobile salesman."

The Retort Discourteous

"An' look at you' Mammy. She takes in washin', don' she?"

"Sho she do. You don't think she's lef this out on de line lessen you' Pappy wuz in jail, does you?"

Outsmarted

Dimwitt: "At the party last night I won the prize for being the homliest man."

Bimbo: "You chump; why did you take such a chance by attending the party?"

Dimwitt: "Because I thought you were going to be there."

Bachelors Again

"What d'ya say, Jim, we get our wives together tonight and have a big time?"

"Okay by me, Joe, where'll we leave 'em."

Better Unlit

"Try one of these cigars, they're the best thing out."

"Yes, but how are they when lit?"

Wrong Time to Laugh

"What are you crying for, Willie?"

"Cause Uncle John d-dropped a b-big b-box on his t-toe."

"Oh, that's nothing to cry about. Why didn't you just laugh?"

"That's what I d-did."

Gotkool
WATER CANS & COOLERS
GOTT Water Cans are the practical way to keep drinking water cool for long periods, protected from impurities and always handy to the job. Snug fitting large removable top, strongly built to withstand rough usage. GOTT Water Coolers have extra large covers and a handy non-leaking push button faucet. Your Supply Store has them, get one today! . . . . . .
GOTT WATER CAN
Made in 1½, 3, 5, and 10 gallon sizes.
GOTT WATER COOLER
Made in 3, 5, 8, 10, and 20 gallon sizes.
H. P. GOTT MFG. CO.
WINFIELD, KANSAS
KEEP PURE DRINKING WATER ALWAYS HANDY

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A. M. Byers Co.	8
Byron Jackson Co.	—

C

Jo H. Cable	—
Cameron Iron Works	—
Carlyle Rubber Co.	—
Carnegie-Illinois Steel Corp.	—
J. I. Case Co.	87
Caterpillar Tractor Co.	—
Chain Belt Co.	—
The Chapman Valve Manufacturing Co.	—
Chiksan Oil Tool Co.	91
Climax Molybdenum Co.	92
Columbia Steel Co.	—
Columbian Steel Tank Co.	—
Continental Motors Corp.	—
The Continental Supply Co.	5
Fred E. Cooper Co.	Third Cover
The Cooper-Bessemer Corp.	—
Core Drilling, Inc.	—
Cotta Transmission Corp.	—
Crane Co.	—
Cummins Engine Co.	—
W. H. Curtin Co.	—

D

Darling Valve & Manufacturing Co.	—
The Dayton Rubber Mfg. Co.	—
Deckard Manufacturing Co.	—
Dedman Foundry & Machine Co.	—
DeWitt Operated Hotels	88
Diamond Chain & Manufacturing Co.	—
Dowell Incorporated	—
Dragon Manufacturing Co.	—
E. I. du Pont de Nemours & Co.	—

E

Eastman Oil Well Survey Co.	—
Economy Electric Lantern Co.	—
Elliott Core Drilling Co.	—
Elliott Manufacturing Co.	—
Enardo Foundry & Manufacturing Co.	—

F

Geo. E. Failing Supply Co.	—
First National Bank in Houston	—
First National Bank & Trust Co. of Tulsa	—
Fluid Packed Pump Company	—
The Fort Worth Laboratories	91
Benjamin Franklin Hotel	88
Franks Machine Co.	—
Frick-Reid Supply Corp.	—

G

Gardner-Denver Co.	—
The Garlock Packing Co.	—
Gas Lift Corp.	—
Gaso Pump & Burner Manufacturing Co.	—
Gearench Manufacturing Co.	—
General Electric Co.	—
General Engineering & Model Works	—
General Motors Corp.	—
Geophysical Service, Inc.	—
Goodyear Tire & Rubber Co.	—
H. P. Gott Manufacturing Co.	97
Grant Oil Tool Co.	—
Gray Tool Co.	—
The Guiberson Corp.	—
Gulf Coast Machine & Supply Co.	—
Gulf Envelope Co.	—
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H

Halliburton Oil Well Cementing Co.	First Cover
Hamer Oil Tool Co.	—
Hardway & Cathey	91
Harnischfeger Corp.	—
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Hazard Wire Rope Division, American Chain & Cable Co.	—
The Hercules Powder Co.	—
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Hoard Exploration Co.	96
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Houston Lighting & Power Co.	—
Hughes Tool Co.	36-37 and Fourth Cover
Humble Oil & Refining Co.	—
Hyatt Bearings Division	—

I

Christian Iden	91
Independent Exploration Co.	—
The Inferno Co.	—
Ingersoll-Rand Co.	—
International Derrick & Equipment Co.	—
International Harvester Co.	—
International Petroleum Exposition	—
The International Nickel Co.	—

J

D. O. James Manufacturing Co.	—
Jarecki Manufacturing Co.	—
Jensen Brothers Manufacturing Co.	—
Johns-Manville	—
The S. M. Jones Co.	—
Jones Oil Co.	—
Jones & Laughlin Steel Corp.	Second Cover
Jones-Shelburne, Inc.	—

K

The Kennedy Valve Manufacturing Co.	—
Kerotest Manufacturing Co.	—
Keuffel and Esser Co.	—
Keystone Driller Co.	—
Kinzbach Tool Co.	—
Kobe, Inc.	—
Kodiak Guides	91
Koppers Co.	—
Kropp Forge Co.	—

L

Laminated Shim Co.	—
Landis Machine Co.	—
Lane-Wells Co.	—
Larkin Packer Co.	—
The Layne & Bowler Co.	—
Lee Rubber and Tire Corp.	—
A. Leschen & Sons Rope Co.	—
The Lincoln Electric Co.	—
The Line Scale Co.	—
Link-Belt Co.	—
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Lucey Boiler & Manufacturing Co.	—
Neal Lucey Co.	—
Ludlow Valve Manufacturing Co.	—
Lufkin Foundry & Machine Co.	—

M

MacClatchie Manufacturing Co.	—
Macwhyte Co.	—
D. S. Mair Machinery Corp.	—
Maloney Tank Manufacturing Co.	—
Manhattan Rubber Division	—
The Marley Co.	—
Martin-Decker Corp.	—
Marmon-Herrington Co.	—
McGill Manufacturing Co.	—
McKissick Products Corp.	—
Merco Nordstrom Valve Co.	—
Merla Tool Co.	—
Metric Metal Works	—
Miller Sand Pump Co.	—
Mills Bennett Production Co.	—
Mission Manufacturing Co.	—
E. H. Moore, Inc.	—
Lee C. Moore & Co.	—
Morse Chain Co.	—
Motor Improvements, Inc.	—
U. C. Murcell, Inc.	—
Muskogee Iron Works	—

N

National Bank of Tulsa	4
National Lead Co.	—
The National Supply Co.	39
National Tube Co.	—
New Deal Specialty Co.	—
Hotel New Weston	—
Norma-Hoffmann Bearings Corp.	—
Norvel-Wilder Supply Co.	—
Novo Engine Co.	—

O

Walter O'Bannon Co.	—
O.C.S. Manufacturing Co.	—
Oil Center Tool Co.	—
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Oil Well Supply Co.	51
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P

G. N. Parker	—
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Petty Geophysical Engineering Co.	—
Philadelphia Gear Works	—
Pittsburgh Equitable Meter Co.	—
Pittsburgh Steel Co.	—
Hotel Pittsburgher	96
Plymouth Cordage Co.	—
Portable Rig Co.	—

R

Raybestos-Manhattan	—
Reading-Pratt & Cady Division American Chain & Cable Co.	—
Rector Well Equipment Co.	—
Reed Roller Bit Co.	43 and 61
Regan Forge & Engineering Co.	—
Reliable Supply Co.	94
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A. O. Smith Corp.	46-47
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Howard Smith Co.	—
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Southern Engine & Pump Co.	—
Southern Pacific Lines	—
Southwest Road Show and School	—
Spang & Co.	—
Spang Chalfant, Inc.	—
Sperry-Sun Well Surveying Co.	—
Standard Brake Lining Co.	94
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Star Drilling Machine Co.	—
Sterling Engine Co.	—
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Sun Oil Co.	—

T

Templeton, Kenly & Co.	—
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Thermoid Rubber, Division of Thermoid Company	—
Thornhill-Craver Co.	—
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U

Union Carbide & Carbon Corp.	—
Union Wire Rope Corp.	—
United Geophysical Co.	—
United States Rubber Co.	—
United States Steel Corp.	51
Universal Atlas Cement Co.	—

W

Warner & Swasey Co.	—
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Westinghouse Electric & Mfg. Co.	—
Wheeling Machine Products Co.	—
Wickwire Spencer Steel Co.	62
J. H. Williams & Co.	—
Paul B. Williamson	—
Wilson Supply Co.	—
Witte Engine Works	—
Worthington Pump & Machinery Corp.	—

Y

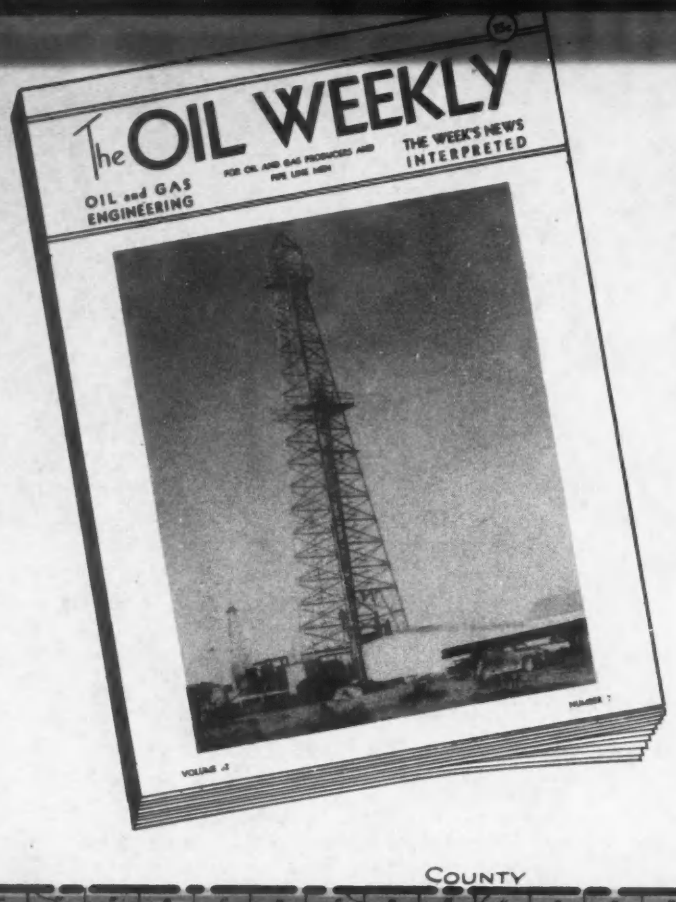
Young Engine Corp.	—
Youngstown Sheet & Tube Co.	—

Supplement to the

JANUARY 2, 1939

Issue of

THE OIL WEEKLY



SHERMAN COUNTY

SUNRAY

BRUMLEY

DUMAS

BLOCK 44

BLOCK 3-T

BLK M-1

BLK G & M 3

BLK 8-T

BLK 8-12

BLK 8-10

BLK 26

BLK P M

BLK 018

BLK 2

T & N O R R

H & T B R R

D & P

G & M CO

T L & R R R R CO

POITEVENT

Big

Bivins

Subsurface Geological Ma

Showing formations occurring at about 100 feet above sea-level,

Ex

1. **Along most of the contacts between the adjoining zones, the production comes not only from the zone as indicated, but a varying amount comes from the adjacent zone. The one indicated is the most important. Individual notation will be made where this condition is particularly noticeable and important with regard to production.**
2. **In the Noel-Schafer pool, the leases located in the D zone area almost always will obtain a goodly share of production from the underlying E^1 subzone. Because of the uncertainty of the D zone, the more prolific production may occur in the E^1 subzone occasionally.**
3. **In Saunders area (sections 38, 58, and 59 in particular), production comes from a series of formations starting in the C^1 through D and ending in E^1 occasionally. The entire section from the top of D zone down is confused and consists largely of arkosic lime and dolomite with much bentonitic shale interbedded. The main pay is below the C^1 subzone (C^2 subzone is absent).**
4. **The area in western Hutchinson County (Almaquaie S tinez Surveys and surrounding territory) is listed as the C^2 lime. Actually, the producing formation is a dolomite located in the upper 50 feet of the lime secti order to preserve the geological continuity and becaus relationship of this dolomite to the C^2 lime, it is inclu dolomite is entirely different from the usual C^2 dolo Borger and elsewhere.**
5. **The area around LeFors indicated as solid granite is an mass levelled on top. There are, most likely, numerous granite and an occasional oil well will result if there drilling. Most wells in the vicinity get small shows granite.**

urface Geological Map of Texas Panhandl

ng at about 100 feet above sea-level, and therefore showing from which

Explanation of Geologic Map

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4. The area in western Hutchinson County (Almaquaie Survey, Neil, Martinez Surveys and surrounding territory) is listed as producing from the C² lime. Actually, the producing formation is a 20-foot bed of dolomite located in the upper 50 feet of the lime section. However, in order to preserve the geological continuity and because of the intimate relationship of this dolomite to the C² lime, it is included herein. The dolomite is entirely different from the usual C² dolomite as found at Borger and elsewhere.

5. The area around LeFors indicated as solid granite is an elevated granite mass levelled on top. There are, most likely, numerous fractures in the granite and an occasional oil well will result if there is any further drilling. Most wells in the vicinity get small shows in the creviced granite.

6. The Saunders pool, the oval shaped patter sections 57, 58, 40, and 39 and midway be productive mainly from the formation as of the steep dip and thinness of the forma duced from neighboring formations bot indicated zone.

7. In the formations around the rim of the L mite may also produce from the lower ha production comes from a series of formati contact and produces above and below.

8. The granite wash of the Burnett pool i amount of lime but is so unimportant th as granite wash.

dle Oil & Gas Field

ich zone or formation oil will be produced, if present

pattern lying at the intersection of
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n as indicated. However, because
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s both under and overlying the

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er half of the C zone. In fact, the
rmations which cuts across the C-D
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ool is cemented by a very small
nt that the pool has been classed

9. In the area in the Neil Survey (Carver Subdivision), western Hutchinson County, the formation is indicated as a lime. It is equivalent to the C^2. The lithology is not a true lime, but instead is largely a lime and dolomite replaced by chert with thin streaks of lime above.

10. Extending from the West Pampa pool (Section 150, Block 3) to the town of Stinnett, the wells drilled along the contact of C^1 and C^2 produce from both formations. The width of this area is about one quarter of a mile on either side of the contact between each formation.

11. This area is represented as Ordovician. Actually, the area represented shows where Ordovician material was found. In some instances (particularly on the north of the "outcrop") it is in place; in other areas it is detrital or reworked.

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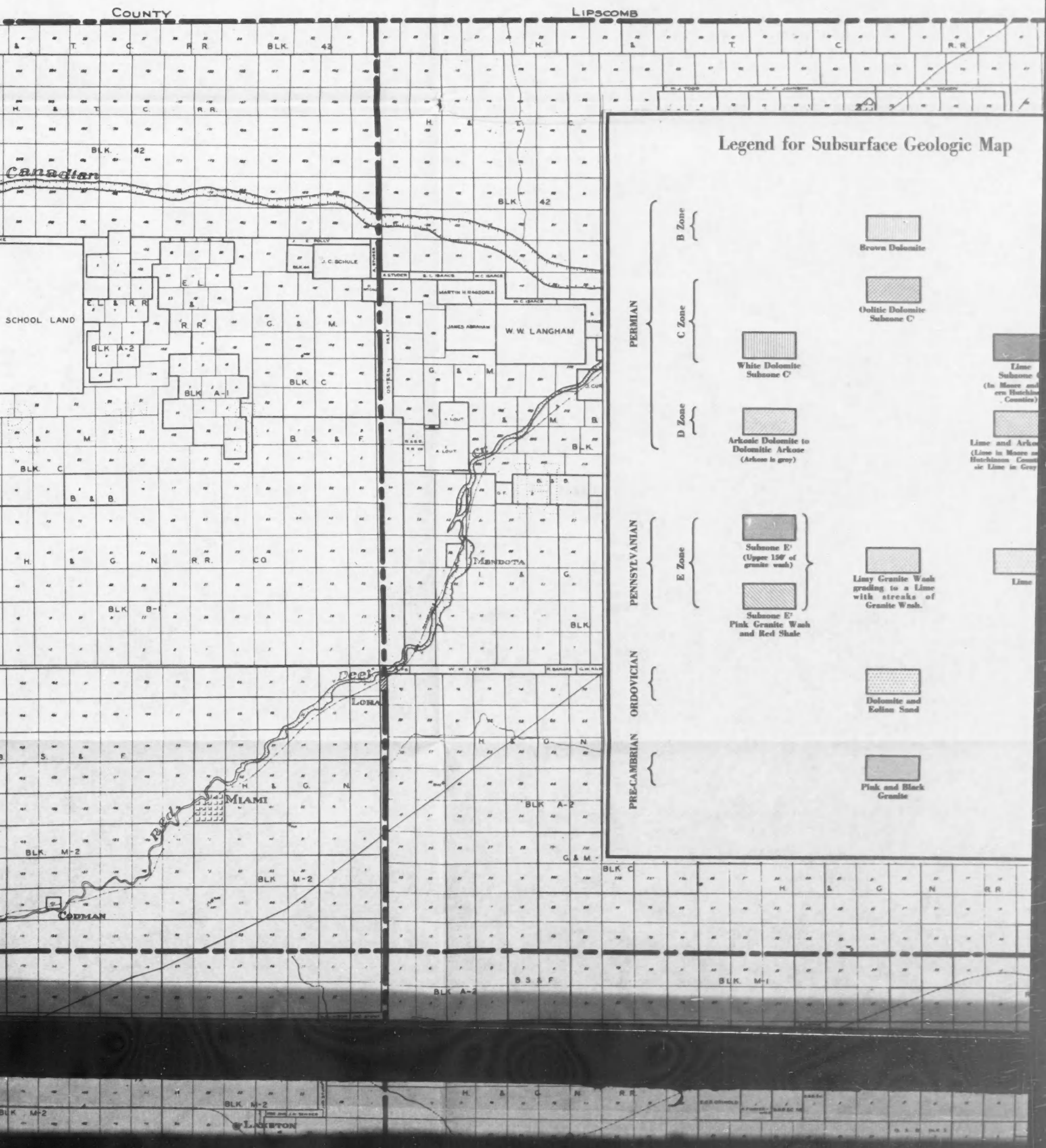

l Map of Texas Panhandle Oil & Gas Field

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Explanation of Geologic Map

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likely, numerous fractures in the
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6. The Saunders pool, the oval shaped pattern lying at the intersection of sections 57, 58, 40, and 39 and midway between Pampa and LeFors, is productive mainly from the formation as indicated. However, because of the steep dip and thinness of the formations, much of the oil is produced from neighboring formations both under and overlying the indicated zone.
7. In the formations around the rim of the LeFors basin, the D zone dolomite may also produce from the lower half of the C zone. In fact, the production comes from a series of formations which cuts across the C-D contact and produces above and below.
8. The granite wash of the Burnett pool is cemented by a very small amount of lime but is so unimportant that the pool has been classed as granite wash.

9. In the area in the N
son County, the for
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and dolomite repla

10. Extending from the
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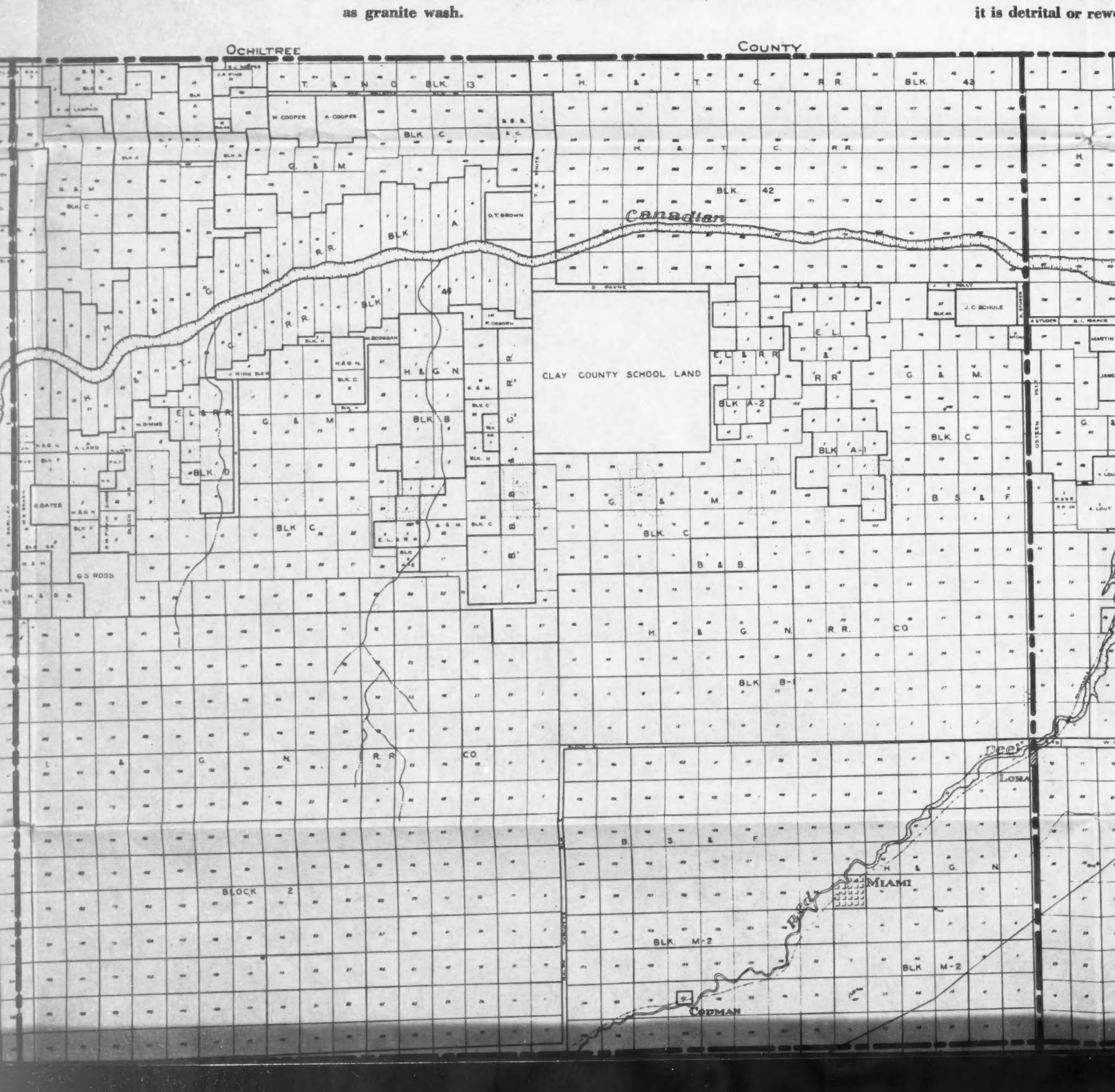

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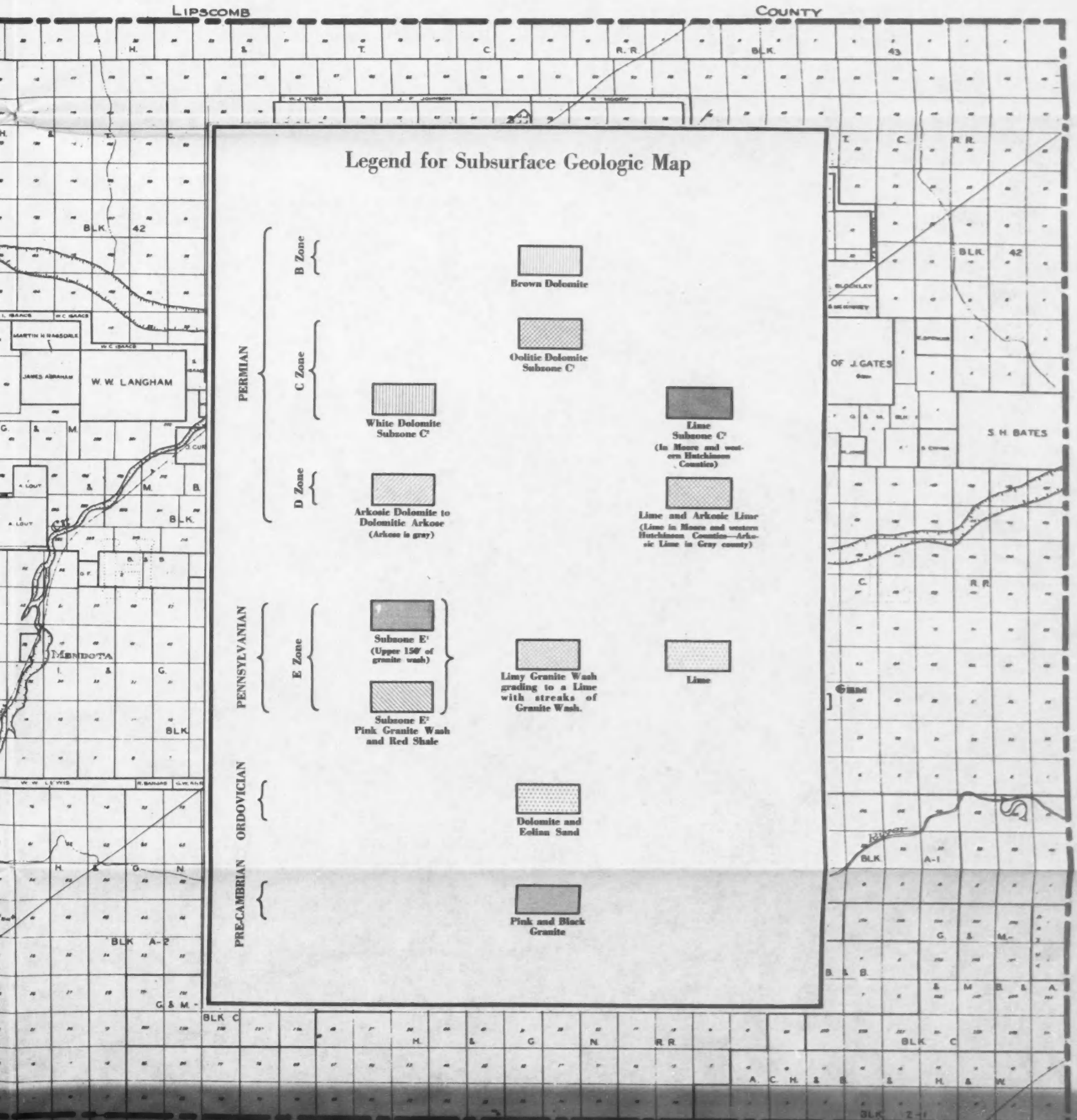
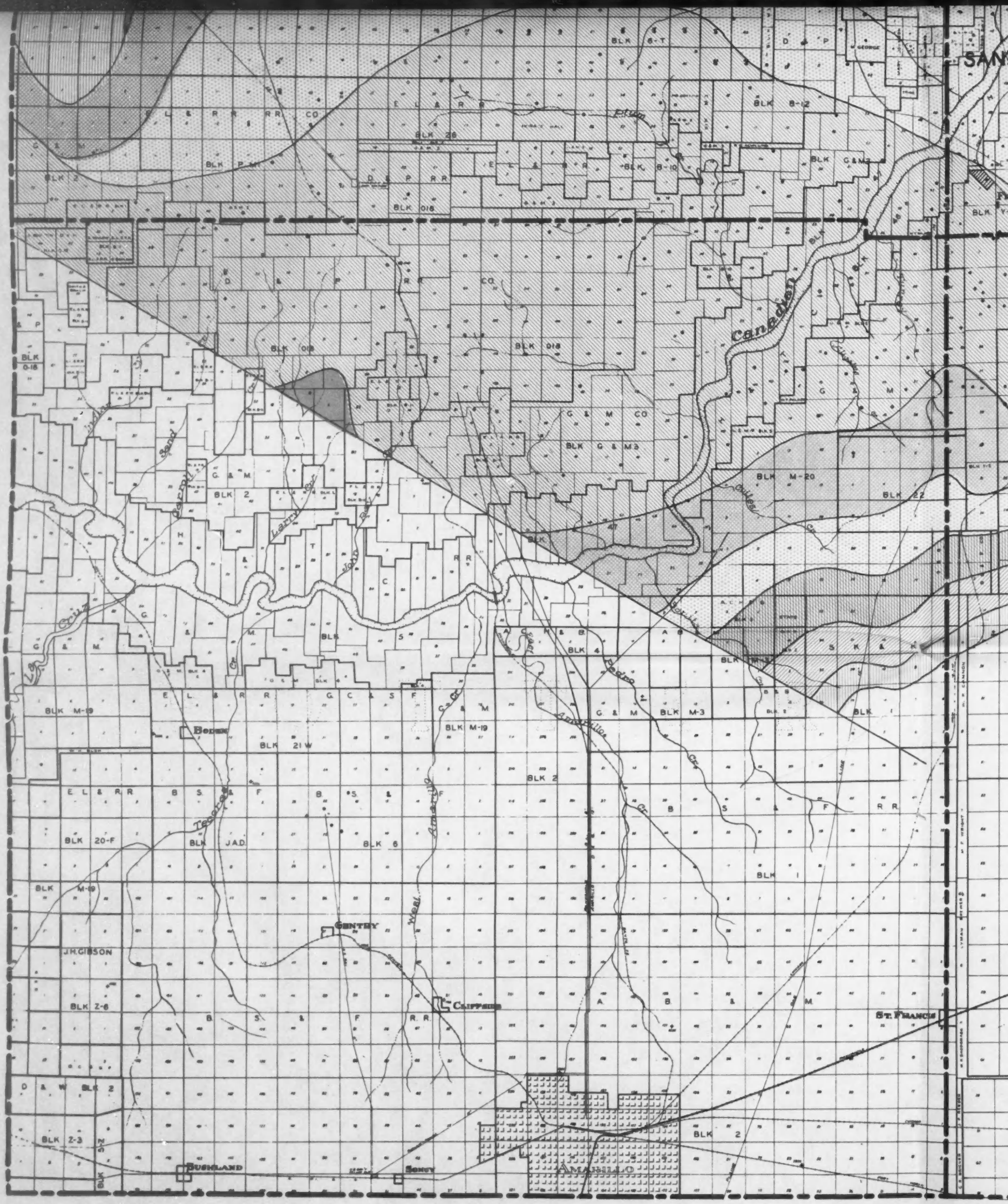
Map prepared by
HENRY ROGATZ
Consulting Geologist

on base furnished through the courtesy of Victor C. Cotner, chief geologist of Columbian Fuel Corporation.




BLK 6-T
D & P
ST. GEORGE
SAN
E L & R R RR CO
BLK 26
BLK P M
BLK 2
D & P RR
BLK 018
E L & R R
BLK B-12
BLK B-10
BLK G & M3
Plum
Canadian
BLK 018
BLK 018
BLK 018
G & M CO
BLK G & M3
BLK M-20
BLK 22
47
Sand
Quitaque
Quitaque Cr
Lazy Bar
Lazy Bar
La Cruz
BLK M-19
BOLES
BLK 21 W
E L & R R G C & S F
BLK M-19
Arroyo
Arroyo Cr
BLK 4
Pedro
BLK M-3
BLK 2
E L & R R
B S & F
B S & F
R R
Tenaha
BLK 20-F
BLK J A D
BLK 6
BLK M-19
West
Amarillo
BLK 1
GENTRY
J H GIBSON
BLK Z-6
CLIFFSIDE
B S & F R R
A B & M
ST. FRANCIS
D & W BLK 2
BLK Z-3
BUSHLAND
SUNNY
AMARILLO
BLK 2

SANFORD-YAKE

PANTEX

BORGER

MOORE-WATKINS

BURNETT

GARNER

WEST JORDAN

ROXANA

NOEL-SCHAFER

FIELDS

PANHANDLE

CONWAY

GROOM

SANFORD-YAKE

PANTEX

BORGER

MOORE-WA

BURNETT

GARNER

WEST JORDAN-FOSTER

ROXANA

NOEL

FIELDS

PANHANDLE

ST. FRANCIS

CONWAY

WATKINS

WEST PAMPA

DEL-SCHAFER

PAMPA

LATHAM

SOUTH PAMPA

SAUNDERS

SHORT

FINLEY

WILLIAMS-DAVIS

BOWERS

FURNEAUX

CHAPMAN

CLAYTON

VULCAN

MIAMI

CODMAN

HOOVER

HEATON

LAKETON

ROCKWALL COUNTY

GROOM

McLEAN

ALANREED

BLOCK 2

BLOCK B-2

BLOCK B-3

BLK M-2

BLK A-6

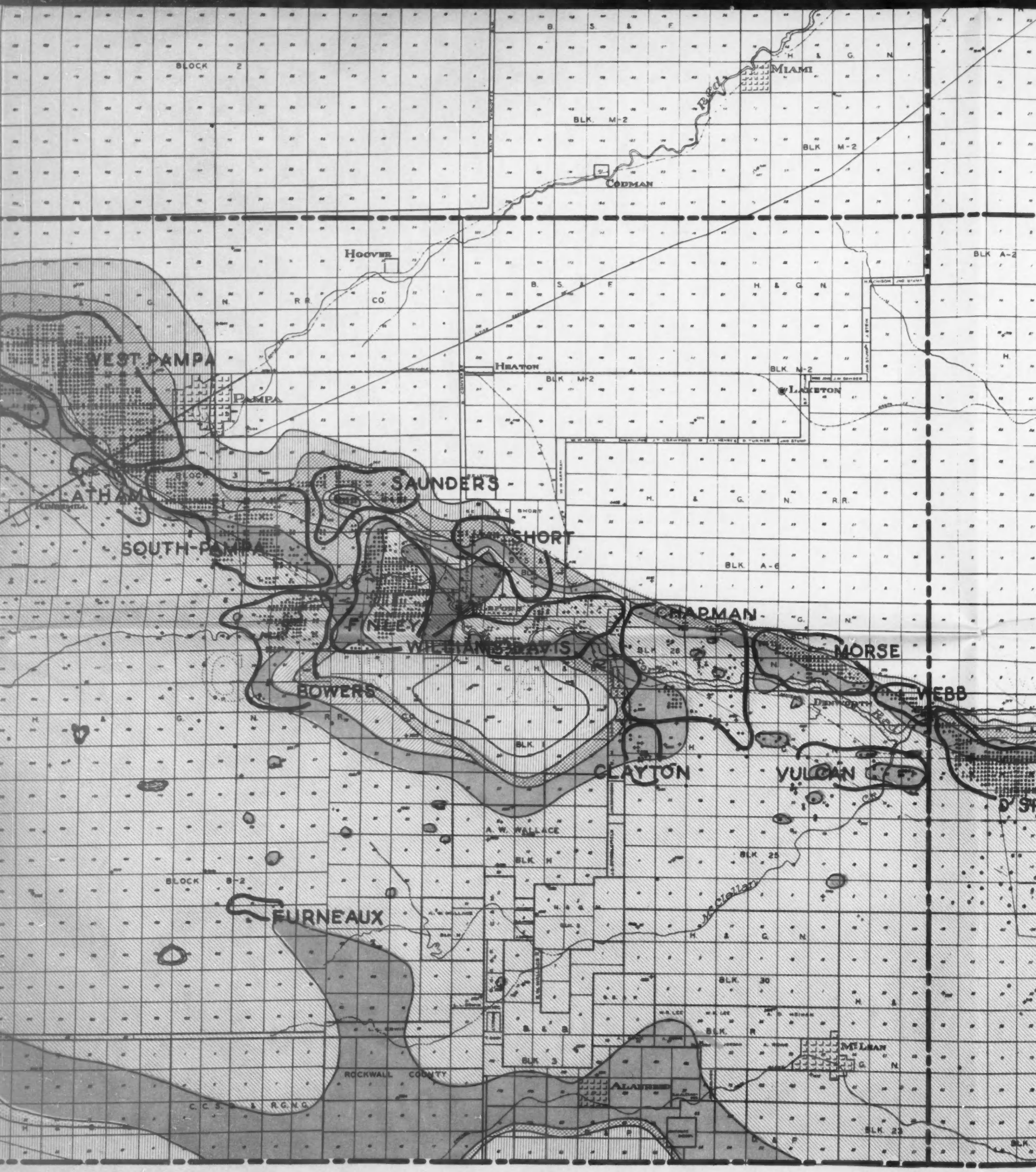
BLK 25

BLK 30

A. W. WALLACE

R.R. CO.

C.C.S.D. & R.G.N.G.


BLOCK 2
B. S. & F.
H. & G. N.
Red
MIAMI
BLK. M-2
BLK M-2
CODMAN
HOOVER
G. N. R.R. CO.
B. S. & F.
H. & G. N.
BLK A-2
WEST PAMPA
PAMPA
HEATON
BLK. M-2
BLK. M-2
LAKETON
ATHAM
SAUNDERS
SOUTH-PAMPA
SHORT
BLK. A-6
H. & G. N. R.R.
CHAPMAN
FINLEY
WILLIAMSON-DAVIS
MORSE
BOWERS
BLK. 1
CLAYTON
VULCAN
WEBB
A. W. WALLACE
BLK. H
BLK. 25
BLOCK B-2
FURNEAUX
McClellan
H. & G. N.
BLK. 30
BLK. R
McLEAN
BLK. 3
ROCKWALL COUNTY
ALANREED
C. C. S. & R.G.N.G.
BLK. 23

PRE-CAMBRIA

Pink and Black Granite

BLK A-2

G. & M.-

BLK C

H. & G. N. R. R.

B. & B.

G. & M.

B. & B. & A.

A. C. H. & B. & M. & W.

BLK Z-1

B. S. & F.

BLK. M-1

ROBERTS & EDDLEMAN

BLK RE

CAMP COUNTY SCHOOL LAND

BLOCK H

E. G. B. GRIMOLD

B. & B. BLK 1

B. & B. BLK 5

B. & B. BLK 2

THOS. JAMES

BLOCK E

NEW MOBETIE

MOBETIE

Sweetwater Creek

BLK A-5

BLK A-4

BLK A-3

WHEELER

I. & G. N. R. R.

H. & G. N.

A. B. & M.

BLK A-9

BLK A-8

BLK A-7

J. M. LINDSEY SUR

BLK L

J. POITEVENT

B. TINSDALE

Red River

KOONS-BENTLEY

O'BRIAN

MAGNET

LAYCOCK

BLK A-8

TWITY

BLK A-7

BLK 24

TECI

LELIA

SHAMROCK

REMO

BENONINE

BLK 23

RAMSDELL

BLK 17

BLK 13